IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication MARCH 30, 1961

★ Gulf's Electronics Coordinator R. J. Baxter

Are Computers Moving Into Management? p. 69

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Heavy Duty ROLL GRINDERS

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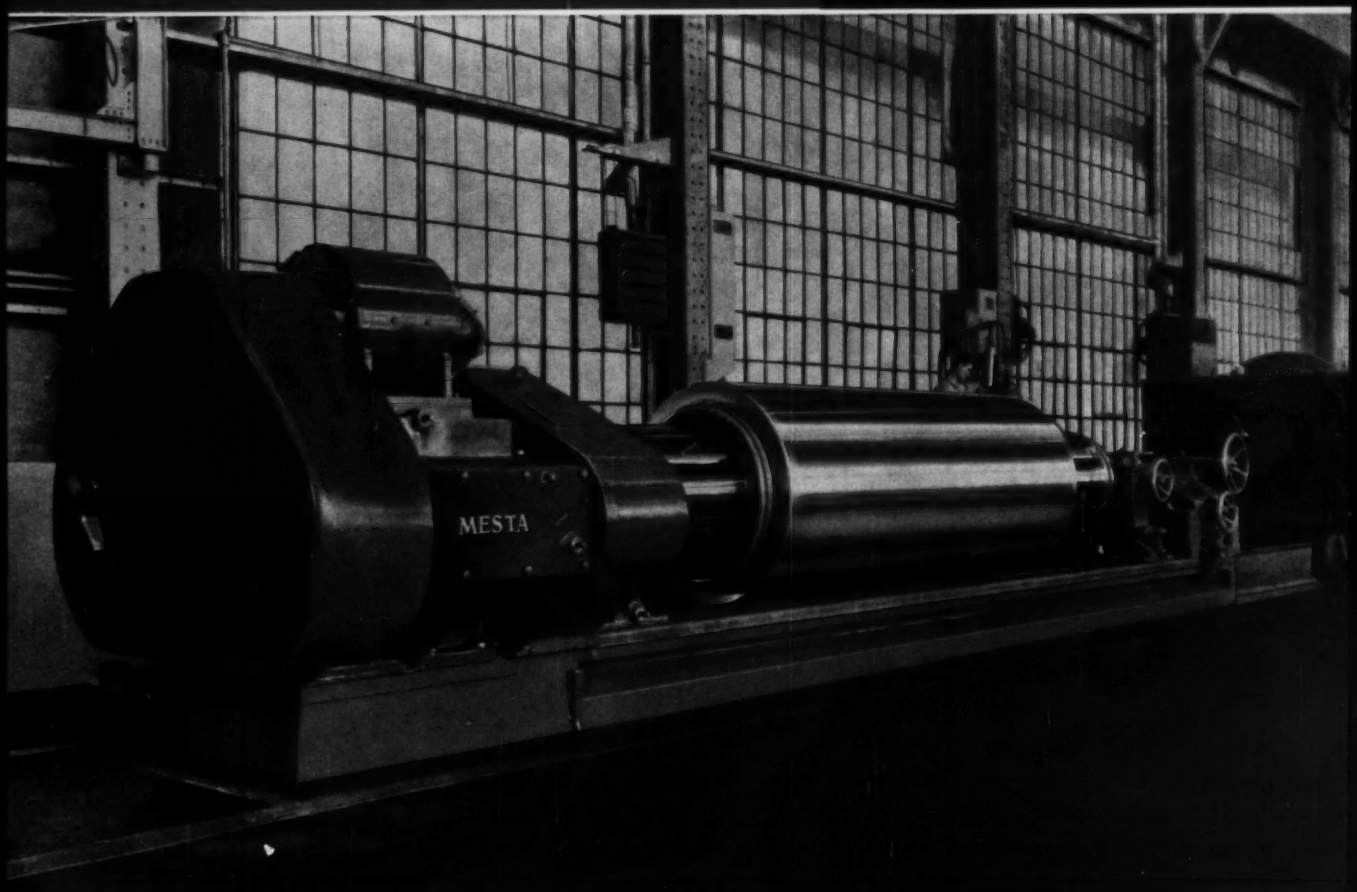

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March 30, 1961—Vol. 187, No. 13

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Special This Week

Computers Move in on Managers

The need for fast, accurate decisions is beginning to outstrip the capabilities of human beings. More and more computers are being called on to do the job. They are being used in rolling steel. They run complex chemical plants. They maintain inventory and accounting data. Are they replacing managers? p. 69

Is Capital Spending Upturn Coming?

An upturn in metalworking's spending for plants and equipment is probably in the making. Latest IRON AGE survey of the industry's capital appropriations indicates it could show up in capital goods orders from middle to end of the year. p. 81

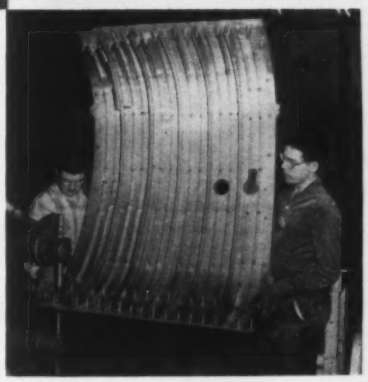
How to Improve Plating Operations

It's hard to prevent hydrogen embrittlement in applying thickly-plated protective coatings. But there's a way around this bottleneck. The solution centers on low-cost mechanical plating in a wet tumbler. Glass impactors yield true metallic bonds. p. 107

Next Week

Ways to Weld Space Age Metals

Reactive metals have the properties it takes to conquer space. To win this battle, however, these metals must be weldable. The more exotic welding methods are starting to move out of the research lab and onto the production floor.



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Report From the Far East

American Nationalism: What's the Matter With That?

No matter where you go in the world, you find nationalism. Sometimes it is a hard type that shows much hate. At other times it is masked with politeness or vagueness. But it is there all the same.

Especially here in the Far East, one sees strong nationalism. This is but part of a world-wide rebellion or resurgence of people who have seen what can be wrought by a better standard of living. They seek a way out of a poverty they now know is not eternal.

But the more you see of all this, the more you become convinced that American nationalism is a good thing. We are not referring to the "Fortress-America" type, or the type that hates all foreigners, or the type that takes a short-term view. There is a new type that should be emerging at home.

Certainly it is now time to take a close look and make a deep analysis of our so-called foreign aid. Of course we can and should help around the world. But it is also time that we gave up using only our emotions instead of our brains.

Our emotions will tell us that other people need help, that they need understanding and that we do have at least a moral duty to do something.

However, it is not the right thing to give people things they don't want or need. It is not real aid to weaken ourselves so others can have things they don't want—or don't need—in the first place. The whole question is complex. It isn't all black or all white.

The more we give away with a lack of planning or reason, the more we lose face in this part of the world. The more naive we are in trying to save the world—on our terms—the sillier we look in the eyes of many in this part of the world.

No longer can we act like Santa Claus. Nor can we fail to help where it will do the most good. That does not mean we have to adopt a tough and hard-reckoning type of foreign aid. It does mean there should be more "accounting" for what is being done.

In cases where our friends or allies are able to carry a bigger burden, it is up to them to do it. It is up to us to do away with our wasteful practice of giving more than the facts warrant.

We can't buy people with money or with things they don't need. Their basic needs involve power plants, food raising and processing methods, education, and help in their own ways of life. We can help in these things.

But the people we assist must see us stern at times, kind all the time, but above all, sensible.

Tom Campbell

Editor-in-Chief

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What's the Price Picture?

There isn't likely to be much change in the industrial price structure this year. Particularly in equipment, few manufacturers have enough orders on the books to ease the intense competitive bidding for business.

On commodities, copper has firmed, at about 2¢ per lb higher than most buyers anticipated. Tin, according to one leading buyer, is "the strongest I've seen it." Ferrous scrap, on the strength of the strongest export market in history, is also on the upgrade in spite of weak demand at home. But none of these more volatile commodities is likely to run away unless business comes faster than expected.

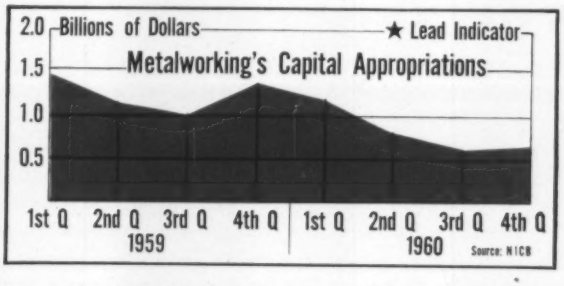
The outlook for later this year is a firming of the price structure as business improves and if capital spending accelerates.

Another price note: Prices of aluminum can stock in the highly-competitive metal can market will not be increased unless there is a hike in tinplate prices. And a leading producer says there is no thought at this time of backing away from commodity pricing for the can market.

Capital Spending Edges Up

Spending for new plants and equipment by metalworking companies is starting to show signs of an upturn. But any substantial pickup in new capital goods orders isn't likely before midyear.

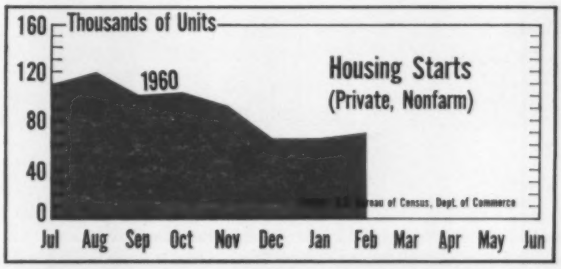
The brighter outlook for the capital goods market is shown by The IRON AGE's most recent survey of metalworking's appropriations. (See p. 81) Thirty-eight



industries boosted fourth quarter '60 appropriations 3 pct over the third quarter. Although small, the gain is the first since fourth quarter '59.

Another Gain: Housing Starts

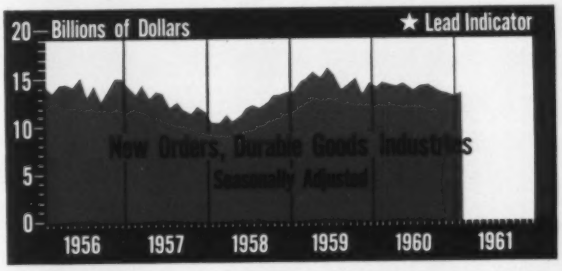
Housing starts picked up modestly in February, with the annual rate (private nonfarm) edging up to 1.1 million. This is on the basis of 74,200 starts, up 5



pct from January. Most of the pickup was noted in the Northeast. There, work was resumed after the area dug out from under the January snows which slowed construction during the month.

New Orders Reverse Downtrend

New orders of durable goods manufacturers also eased up a bit in February. While not a major jump,

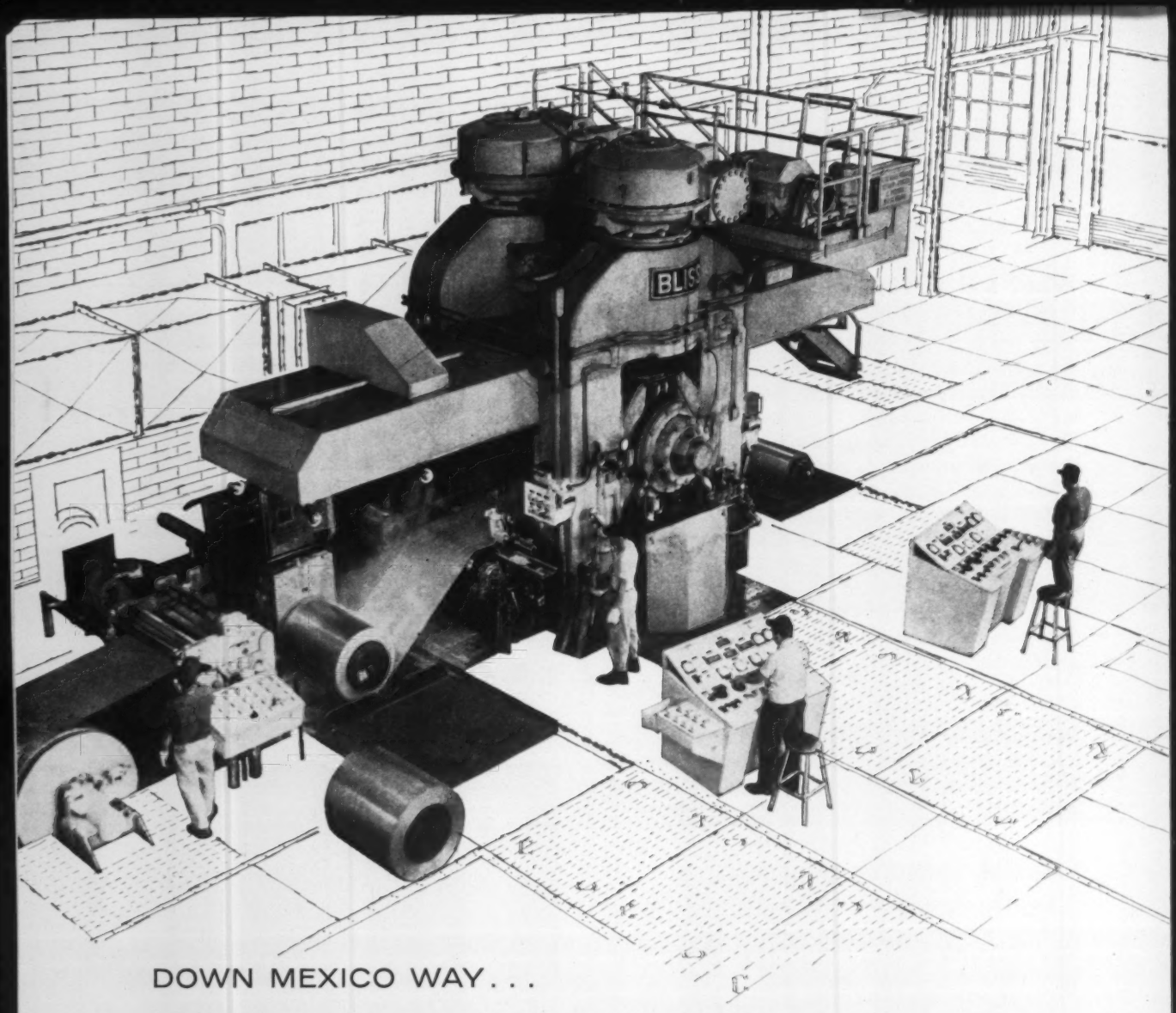


the pickup in new business is one of the most encouraging of the current batch of business indicators. At $13.3 billion, seasonally adjusted, new orders closed the gap on sales, also a good sign. Durable goods manufacturers sales reached $13.4 billion, a small improvement from the previous month. The significance here is that in an uptrend, new orders will run ahead of sales. The reverse is also true. Throughout the decline in 1960, new orders consistently lagged behind sales.

Military spending was the big factor in the pickup in new orders for durable goods.

Business Failures on the Rise

If February was the bottoming out of the recession, it was not apparent in business failures. In number and total liabilities, failures jumped sharply in the month. Failures at 1449 were the highest since April, 1958. Liabilities of $88.1 billion were the highest in six months. Builders and contractors sustained high tolls as did retailers, according to Dun & Bradstreet.



DOWN MEXICO WAY . . .

New Bliss mill ups steel production 25% in one year

Recently, a new Bliss four-high reversing cold mill went into action at Hojalata y Lamina, S.A., Monterrey, one of Mexico's largest producers of strip and sheet. Here's what one of their major executives has to say about it:

"With this Bliss mill, we can handle strip up to 37" wide, as well as tin plate and sheet at speeds up to 1750 fpm. In 1959, we turned out over 176,000 tons. This year, we're sure to pass 220,000."

With a 14½" and 44" x 42" roll arrangement, the mill reduces mild steel between #27 and #35 gages, turning out raw materials for such end products as metal furniture, pipe and beer-bottle caps. Accessories include: two tension reels capable of handling coils up to 15,000 lbs., coil buggies with rigid, welded-steel frames, cone-type payoff reel, quick-opening flattener and feeder, and roll-changing equipment.

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AFL-CIO: Rift Over Picket Legislation

Wounds heal slowly in the union movement wars, particularly when

REUTHER: Sharp Practices?

warriors continue to rub salt into them after the peace is signed.

Plenty of salt has been in evidence in recent weeks as top AFL-CIO leaders rub against each other in the labor legislation battles being waged in Washington.

Three weeks ago, AFL-CIO president George Meany, a craft union man, cold-shouldered 1100 delegates to a legislative rally sponsored by the Industrial Union Dept. IUD is headed by UAW president Walter P. Reuther.

Last week Mr. Meany told 3200 delegates to a similar rally sponsored by the Building Trades Dept. that the construction unions "are the backbone of the labor movement."

The building trades are pushing for passage of a "situs" picketing bill. This would permit a union to picket a construction job even if it stops work on the project by contractors and unions who are not involved in the dispute.

During the rally, Mr. Reuther and IUE president James B. Carey issued a letter. They said language in the bill proposed by the Building Trades would have to be rewritten to extend the picketing privileges to all unions, not just construction unions.

The Building Trades Dept., headed by C. J. Haggerty, is afraid that an open-rift over wording of the bill could spell immediate doom for its already slim chances of passage. Mr. Haggerty has accused Mr. Reuther, Mr. Carey and the IUD with "sharp practices."

Jobless Pay Extension Will Cost $1 Billion

Administration's $1 billion jobless pay extension program was approved last week. It extends unemployment compensation for up to 13 weeks in cases where workers have exhausted state benefits.

Payroll tax on employers will rise from 3.1 pct to 3.5 pct next January 1 in order to pay for the program. The wage base is pegged at $3000 in annual employee pay.

UAW: A $50 Million Strike Fund?

The United Auto Workers' strike fund currently totals more than $35.5 million. This is a gain of $15,279,168 in the past 14 months.

Delegates to a collective bargaining convention in April are expected to vote a special dues assessment to raise the fund to at least $50 million before auto contracts expire Aug. 31.

Asks Help on Wages, Prices

President Kennedy continues to move toward increased government influence over wages and prices. He plans to get help in this move from his Advisory Committee on Labor-Management Policy.

The President expects the committee "to give direction to the general movement of wages and prices."

At the committee's first White House meeting last week, the President told its members that influencing wages and prices was the committee's purpose.

The Chief Executive expects two other matters to get priority attention from the committee. These are:

1. The benefits and problems of automation and other technological advances;

2. Policies designed to insure that American products are competitive in world markets.

These items will be discussed at the committee's next meeting, April 3.

President Kennedy makes it plain that he intends to insure some governmental influence over wages and prices.

He promises to act in advance of any wage-price crisis and urges business and union leaders to help. He told the committee:

"Other Presidents have of course attempted to intervene in the wage-price matter with general exhortations from the White House. These exhortations have not had a very great effect but with your help I intend to get a look at this situation before there is a crisis. I do not want the White House to have to come in at the last minute."

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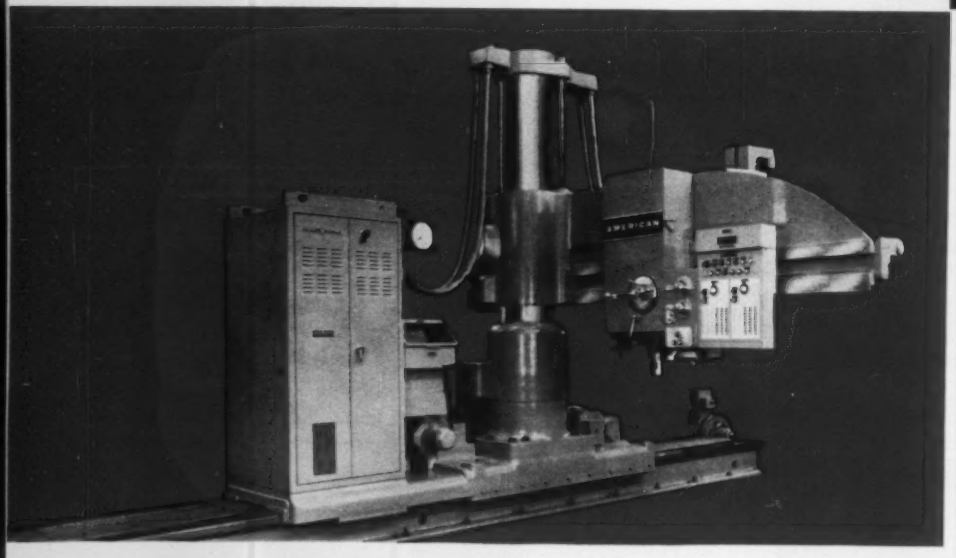

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★ Budget Soars to $84 Billion

President Kennedy plans to pump at least $3 billion more into the economy next year—most of it in deficit spending.

Spending for the year ending June 30, 1962, will reach a peacetime record of about $84 billion, compared to $80.7 billion this year.

But to pump more Federal money into the economy means to put the budget more than $2.5 billion in the red. The budget deficit arises because revenues for 1962 are expected to be $81.4 billion.

The increased spending would go for defense, housing, education, medical care, and veterans benefit programs.

In his budget message to Congress, the President further spells out his tax programs.

He leaves open the possibility he might ask Congress for a temporary anti-recession tax cut. But this is considered unlikely.

The President says Congress should continue corporate and excise tax levies scheduled to end on June 30.

He says he will make other tax proposals later to stimulate business investment and achieve greater tax equity.

Other proposals in the budget include an increase of one cent in the first class postage rates and higher fees for second and third class mail.

It also includes a request that Congress provide more funds for tax enforcement to "increase the collection of Federal revenue, and help curb corruption in and out of government."

■ Govt. Competition To Industry Scored

Republican Congressmen are "afraid" that the Kennedy Administration may not continue to enforce prevention of government competition with private industry.

Legislation to formally establish an anti-competition policy has been introduced by Sen. Wallace F. Bennett, (R., Utah.) His proposal is entitled the "Anti-Government-Competition Act."

Sen. Bennett says: "Many of us who are concerned about the role of the Federal government in relation to private enterprise are afraid that the present Administration may not be as vigorous in implementing this policy as was the Eisenhower Administration."

President Eisenhower, in his last State of the Union message, claimed 2000 government commercial and industrial installations were discontinued during his Administration under "a firm policy of reducing competition with private enterprise."

■ Jobless Areas Get More Govt. Work

Federal, state and local governments have begun a coordinated movement to funnel more government contracts into areas of chronic unemployment.

Pennsylvania is the first state to try the new program.

Commerce Secretary Luther Hodges says Pennsylvania will list the names of local firms in labor surplus areas with the type of contract on which they could compete. The lists will be distributed to contract-letting Federal agencies. Lists also will go to prime government contractors.

Mr. Hodges says his department will request that "maximum consideration be given to firms listed," for direct Federal contracts and for sub-contracts with the prime contractors.

■ War Fear May Spur Tool Modernization

An accelerated government program to bring U. S. industrial equipment up to date may be started in the fear that the nation's machine tools are too outdated to fight any kind of war.

Defense mobilization experts say that over 60 pct of U. S. machine tools are too obsolete to keep industrial production going in either a limited or an all-out war.

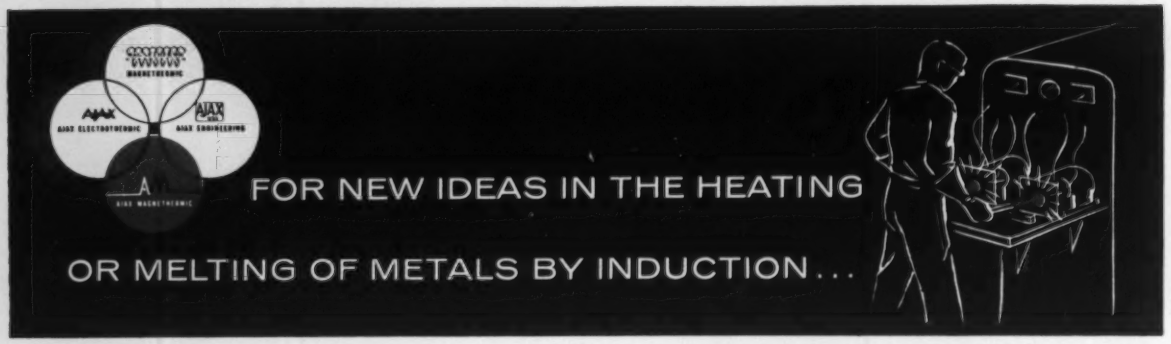
The experts warn the Office of Civil and Defense Mobilization that more than 60 pct of U. S. machine tools are over 10 years old. They consider machine tools built more than a decade ago to be obsolete because of technological advances.

■ Farm Loan Boost Helps Metalworking

Government incentives for farm storage facilities should benefit metalworking industries. The Government is making it easier for farmers to build storage structures through increased loans for building materials.

Farmers will be able to borrow up to 95 pct of the cost of building materials. The old limit was 80 pct.

The Dept. of Agriculture says the added incentives should increase the demand for steel and other materials needed to build the structures. It says $40 million will be spent by farmers on this program.



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Eximbank Offers New Exporting Insurance

U. S. exporters, particularly machinery builders, got a much needed boost from the new export financing and guarantee program of The Export-Import Bank of Washington.

It is hoped the program will place American exporters on a basis of full equality with foreign competitors.

It is a big switch from previous Eximbank policy. And it's devised to meet President Kennedy's call for better export assistance.

The new plan will provide a comprehensive system of all-risk guarantees for goods and products sold on short-term credits.

In the past, the bank has provided only risk guarantees for short-term transactions. Now it will provide short-term guarantees covering credit risks as well as political risks.

Under this plan, private insurers will issue political and credit risk coverage and Eximbank will give appropriate guarantees to the insurers.

The Eximbank put the following innovations into effect:

(1) For semi-finished products and consumer durable goods sold on medium terms, both guarantees and financing are now available.

(2) Financing and guarantees are now offered for equipment sold to public as well as private oil companies.

(3) Advance commitments, where appropriate, may be obtained by American sellers of equipment to place them in a competitive bidding position with foreign sellers and contractors.

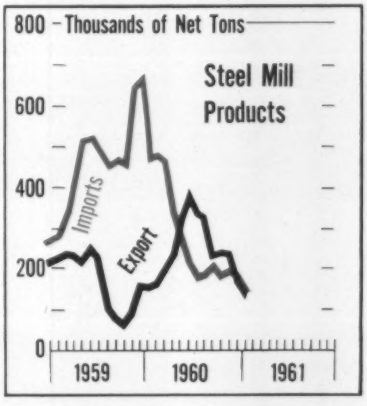
(4) In making credit judgments, the bank now will rely to a greater extent on credit experience and credit reports rather than on financial statements.

(5) Expanded political risk guarantees are now offered for United States' goods held abroad on consignment, exhibited at trade fairs, or leased for use abroad.

The aim of the new program, say Eximbank officials, is to "give all reasonable financial service to American exporters, especially small and medium sized business concerns, so that they may compete aggressively in world markets."

Steel Exports, Imports Fall Off Sharply

Exports of steel mill products dropped again in January. Dept. of Commerce reports export of



132,000 tons is the lowest level since December, 1959. Exports in December 1960 totaled 162,000 tons. Steel sheets, plates, and tinplate accounted for most of the decline.

A cutback in auto production in Western Europe is largely responsible for less foreign interest in steel mill products.

But imports of steel mill products fell in January, too. Total import came to 145,000 tons—down 44,000 tons from December's level. This is the lowest import tonnage since June, 1958.

The higher prices of imported steel and increased sales efforts by domestic producers are responsible for the decline. Concrete reinforcing bars were hardest hit by the drop.

France Lowers Import Duties

Tariff on exports to France will be 5 pct lower starting Saturday. The French government recently announced the 5 pct reduction of custom duties for all imports.

France is also reportedly planning a 10 pct reduction in the six-nation European Common Market by the end of the year. However, the 5 pct drop will apply to all countries. It will remain intact as long as duties do not drop below the common external tariff of the Common Market.

British Auto Sales Pick Up Speed

The recovery in Britain's auto industry is coming faster than expected. Car sales in January totaled more than 56,000. That's nearly 50 pct better than December and only 21 pct below January, 1960. Automakers say it looks like sales will continue to rise—at least through the first half.

Japanese Electronics

Japanese exports of electronic products to the U. S. rose 24 pct last year. Value of the exports were $94 million. This is compared to a 1959 value of $75.6 million. The biggest gain was in radio receivers. Recorders, speakers and receiving tubes also rose in value in 1960.

for every

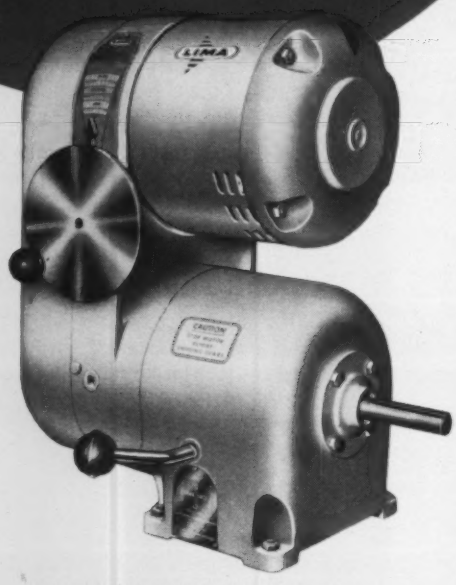
POWER

REQUIREMENT

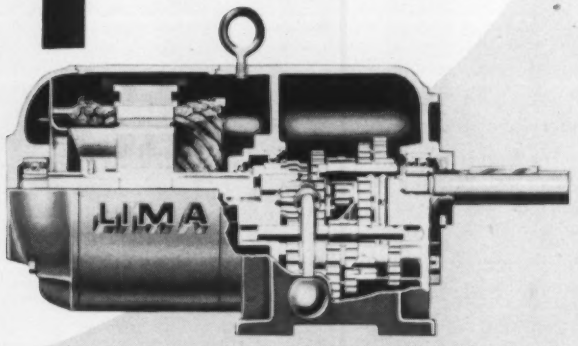
GEAR REDUCERS
1 or 4 Speeds 1 thru 125 HP

Advantages in power equipment are available in **all** LIMA products. If your application involves multiple speeds in power transmission and requires sturdy, dependable power equipment . . . then a LIMA unit is the solution.

LIMA can meet
any POWER need.



VARIABLE SPEED DRIVES
10 TO 1 RATIO
3 TIMES GREATER TORQUE



GEARSHIFT DRIVES
4 or 8 SPEEDS
½ thru 40 HP

- **ELECTRIC MOTORS**
  (1 thru 150 HP NEMA)
- **GEARSHIFT DRIVES**
- **VARIABLE SPEED DRIVES**
- **GEAR MOTORS**
- **GEAR REDUCERS**
- **STRAIGHT LINE REDUCERS**
- **SHAFT MOUNT REDUCERS**
- **GENERATORS**

LIMA

for additional information write:
Patrick F. Dwyer
general sales manager

THE LIMA ELECTRIC MOTOR CO., INC.
LIMA, OHIO

A Member of The Condec Group

Metal-Drawing Lubricant

Leaving no pasty buildups on dies, a new lubricant provides a controllable friction that eases drawing. The newcomer is especially useful in drawing zinc, aluminum and zinc-coated metals. It contains no petroleum oil to cause staining. A thin protective film, left on the work, will not interfere with welding or brazing.

Plastics for Chains

Glass-fiber reinforced plastics serve as the material for round-link chains in Germany. These small-diameter chains are strong enough to hoist heavy loads off the ground. They also have the corrosion resistance to withstand the effects of several years' immersion in the North Sea. Each chain is made by winding impregnated glass filaments in plastic shells.

New Data-Storage Agent

Experiments at the Bell Telephone Laboratories have resulted in a piezoelectric transducer which stores large amounts of information. This

WIDE BANDWAVES: Store more data.

easy-to-make transducer employs a semiconductor layer to generate and detect ultrasonic waves. Since the layer is thin, 10^{-5} cm, the transducer's greatest efficiency is at high frequencies.

Speeds Thickness Checks

Protective and decorative coatings on aluminum can now be checked for thickness in seconds. These checks hinge on a compact portable instrument, with three main uses. It measures the thickness of non-conductive coatings. It gages nonferrous coatings on nonferrous-base metals. And, it so checks the conductivity of nonferrous metals. With minor alterations, the new instrument can measure metal coatings on substrates.

Automates Steelmaking

Without gaging liquid-steel temperatures, an automatic electric furnace maintains alloy analyses. This Swiss pilot plant controls melting rates and prevents overheating of furnace electrodes. Once a power-input program has been fixed, the furnace's low-cost control medium automates all functions. It regulates steelmaking from charge hopper to pouring stages.

X-Rays To Probe Deeper?

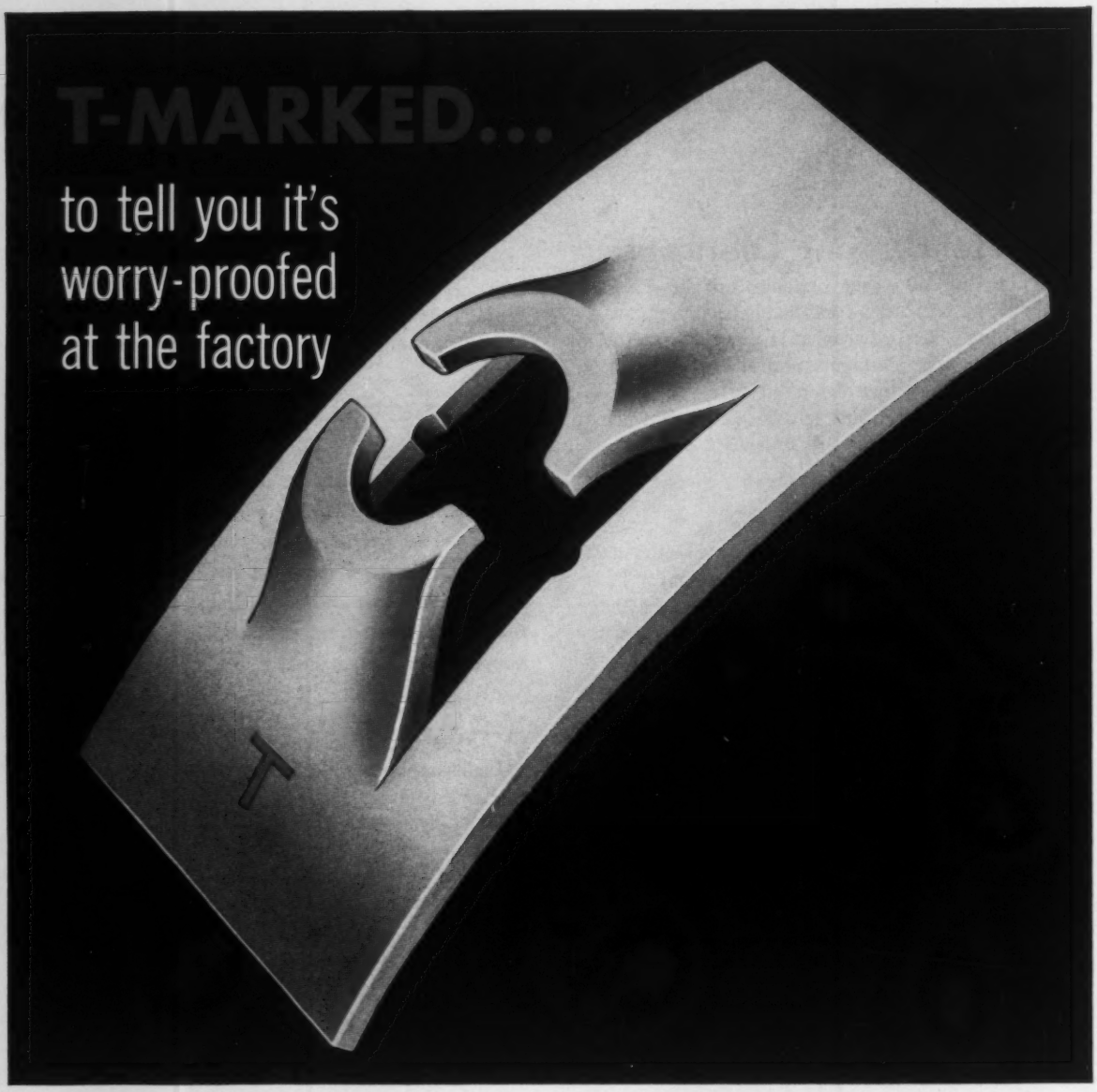
Light-amplification tubes are edging into industrial TV-camera design. One application now under study centers on using the new power tubes for X-ray checks on thick metals. These light amplifiers step up dim X-ray images to normal levels. Thus, low X-ray power sources can be used. This reduces radiation hazards. With the new amplification tubes, small industrial X-ray units probe metals up to 6 in. thick.

Standardize Belt Lengths

Progress is reported in a campaign to standardize the lengths of coated-abrasive belts. Under existing specs, no fewer than 104 different belt sizes are made in lengths from 12-168 in. This situation causes unwieldy inventories, purchasing difficulties and manufacturing bottlenecks. Proposals, which seem certain to be adopted, call for 31 standard belt lengths.

Printed 3-D Circuits

Since the advent of rigid printed circuitry, a large segment of the electronics industry has been aiming at the same target. The common goal is three-dimensional printed circuits. With 3-D circuits, electrical-panel boards could be made in tiny cubes. A small company has found a technique to make this goal a reality.



Other spring fasteners may look like Tinnerman SPEED NUTS. But only the *T-marked* ones really are SPEED NUTS . . . really are "Tinnermans". . . made to highest quality and precision standards to assure worry-proof performance on your assembly.

Here's what the exclusive Tinnerman T-mark means to fastener users:

Over thirty-five years of Tinnerman experience as the originator and largest producer of spring-steel fasteners...the leader in solving your fastening problems,

Outstanding fastener design and production experience that assures you the best possible design of SPEED NUT, whether it is a special SPEED NUT or one of the 10,000 SPEED NUT brand fasteners presently available,

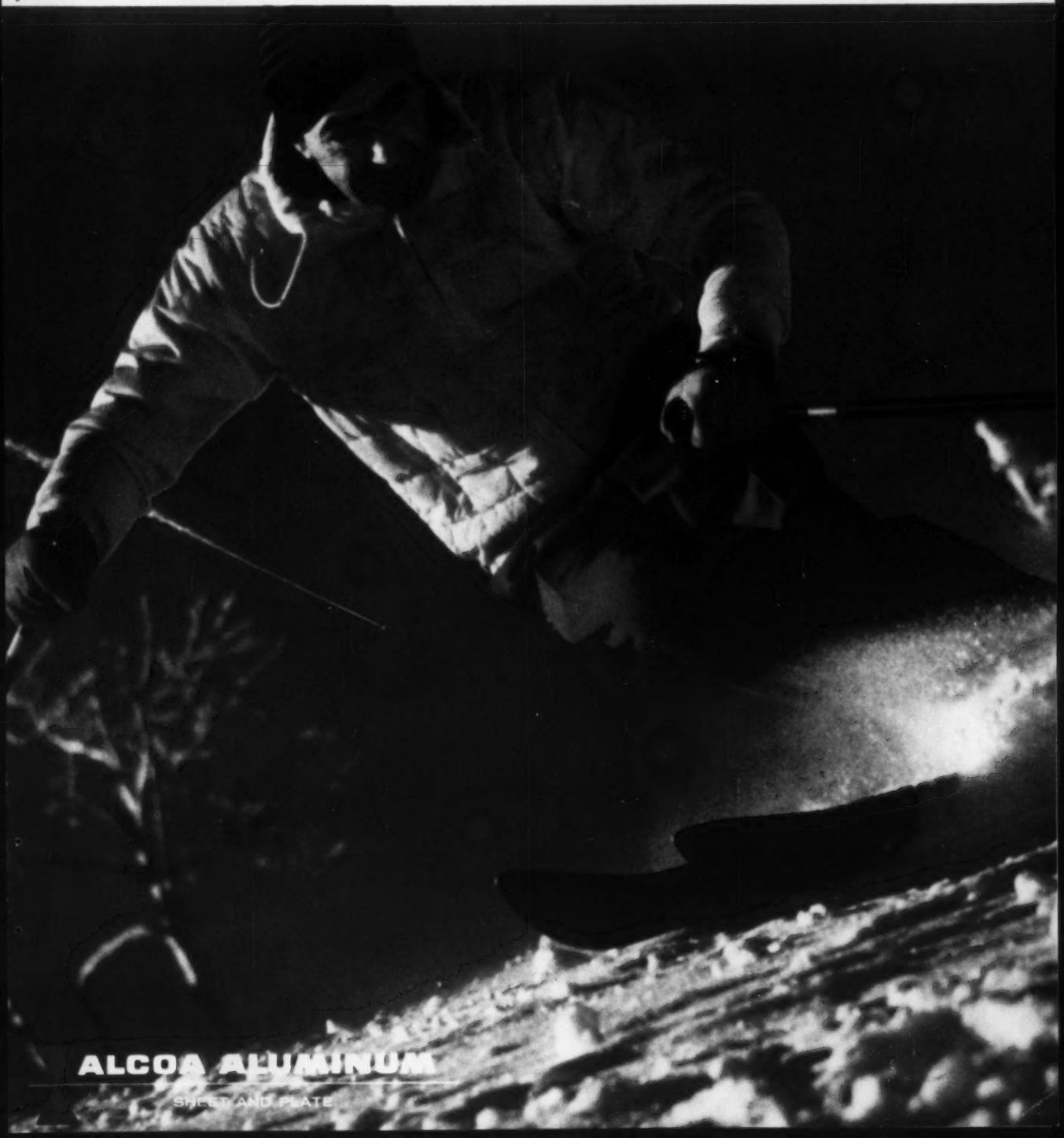
Stringent control of SPEED NUT quality from coil strip to you, including die design, production, heat treatment and finishing.

Be sure you specify "Tinnerman T-marked SPEED NUTS" that give you better fastening, that cut parts and assembly costs, that never let you or your customer down. *Tinnerman Products, Inc., Dept. 12, Box 6688, Cleveland 1, Ohio.*

TINNERMAN
Speed Nuts®
Look for the Tinnerman "T"

When a six-pound aluminum ski takes a 10-G load . . .

Bud Phillips on Head Skis at Mad River Glen



ALCOA ALUMINUM

SHEET AND PLATE

When a 6-pound ski takes a 10-G load . . . # *that's Alcoa Total Ability at work!*

Talk about strength-weight problems! When a husky skier whistles into a tight turn, he puts a surge load of 10-G's or more on a single leg. To stand loads like this, a ski must be strong enough at the footpad to support a ton. At the same time, the ski can't weigh more than five or six pounds.

Head Ski Company was the first ski manufacturer to exploit the gifts of the strongest aluminum alloy made—an Alcoa development. Springy, lively aluminum alloy and Head's mastery of design make possible a sandwich construction which places the elastic, strength-carrying material at the surface, as far as possible from the neutral axis. Lightweight core material in between carries shear loads. Head skis won't twist in action like a wood ski, won't warp, dry out, deteriorate, lose camber or life or resilience or strength.

No one knows more about aluminum sheet and plate—nor makes more alloys, tempers, finishes, widths, thicknesses (even *tapered*)—than Alcoa. *Alcoa Total Ability* includes working with your people from the design stage to the finished product, with significant contributions all along the way. Let us prove it. Simply contact your nearest Alcoa sales office, or write Aluminum Company of America, 855-C, Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

SHEET AND PLATE

ALCOA TOTAL ABILITY GIVES YOU SHEET AND PLATE THAT'S UNSURPASSED FOR . . .

NONTOXIC PROPERTIES

MACHINABILITY

REFLECTIVITY

FORMABILITY

WELDABILITY

HEAT TRANSFER

CORROSION RESISTANCE

FINISH AND TEXTURE

STRENGTH-WEIGHT RATIO

NONSPARKING PROPERTIES

lighten the load

on men and machines with Alcoa Aluminum Wrought Tooling Plate

A tool or jig made of Alcoa® Aluminum Wrought Tooling Plate weighs only one-third as much as it would in steel. One man—or a woman—can handle change-overs where you'd normally use a crane or call several men off their jobs. Aluminum jigs are easier to set up, open, close and store.

Alcoa's wrought plate spares the horses, too. It machines three times faster than steel (and with greater accuracy). You can cut labor costs as much as 60 per cent. Less power is eaten up. Tools last longer.

Alcoa offers two basic grades of wrought aluminum tooling plate, available from conveniently located distributors throughout the country.

ALCOA TYPE 100: A nonheat-treated wrought product for economy where maximum mechanical properties are not required. Offers maximum stability with severely machined end products. **ALCOA TYPE 200:** A wrought heat-treated plate. Stretcher stress relieved for minimum distortion during machining where close dimensional tolerances are not vital but moderately high mechanical properties are called for.

Alcoa also produces a cast, machined plate for use where no distortion in any plane can be tolerated. All three grades are thoroughly described in a new brochure. To get your free copy, call your nearest Alcoa sales office or distributor, or write to Aluminum Company of America, 855-C Alcoa Building, Pittsburgh 19, Pa.

Call The Aluminum Man, your local Alcoa Distributor Salesman

ALCOA ALUMINUM

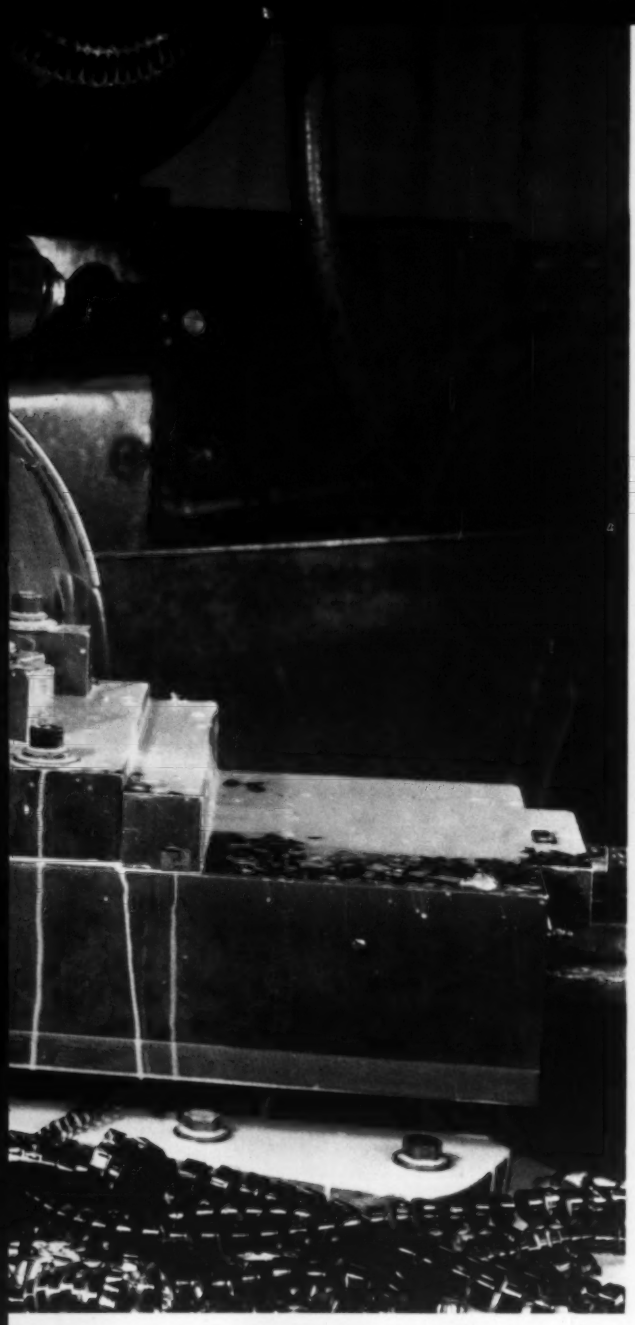
ALUMINUM COMPANY OF AMERICA

Chicago Pneumatic Tool eliminates rust, with Gulfcut® Heavy Duty Soluble Oil . . .

Previously, the Oil Tool Division of Chicago Pneumatic Tool Co. used chemical coolants in a variety of machining operations. But recently, this Fort Worth division switched to a heavy duty emulsifying cutting fluid—Gulfcut Heavy Duty Soluble Oil.

The reason: a rust problem that just wouldn't quit! "Any coolant tends to work into machine operating parts," says Donald Rial, General Foreman. "The trick is to use a coolant with effective anti-rust properties. Then, if the coolant does contaminate gearbox lubricating oil, the gears are protected against rust. Otherwise, an ugly layer of rust forms on tableways and in operating parts.

"However, we haven't had one bit of trouble since the changeover. Although we use a mixture ratio of one part oil to twenty parts water, the anti-rust inhibitor is so completely effective that rust has been eliminated, and yet the emulsion provides the neces-



Profile gage. Height is very critical. It's held to within .005 inches. Note the blanks at left—machined cones at right.

Kenneth Snyder, left, Plant Superintendent, shows Frank Mauro, Gulf Sales Engineer, Chicago Pneumatic's Jet bit. The company also makes Regular and Slant bits.

Grooving a cone for rock drill bit. The coolant: Gulfcut Heavy Duty Soluble Oil. Each cone is AISI 4815 steel. It takes 2½ minutes to groove one cone. Speed: 284 rpm. Feed: .0045 ipr.

improves tool life

GULF MAKES THINGS RUN BETTER!

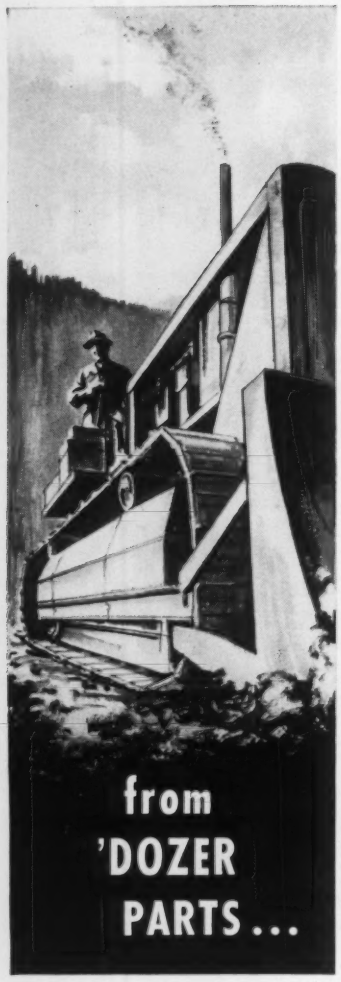
sary cooling and lubrication for good tool life."

"We make and sell rock drill bits," says Kenneth Snyder, Plant Superintendent. "In this competitive business, we need every advantage to maintain an economic production rate. Gulfcut Heavy Duty Soluble Oil has helped improve tool life and reduce maintenance costs—and that's most important to us."

If you've got a machining problem, remember to try the Gulfcut line. You'll soon see how Gulf makes things run better! Call a Gulf Sales Engineer at your nearest Gulf office. Or write for detailed booklet.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Houston 2, Texas

GULF



V-R FIRST CHOICE of more and more industries

V-R Cutting Tool Materials are used throughout the heavy equipment industry to machine components for powerful earth movers, railroad cars, huge trucks — almost any field you can imagine. A complete line enables V-R to supply just the right tool for the job, whether it is taking a rough cut on giant work pieces or a precise finishing cut on parts requiring a superior micro-inch surface.

V-R Investment Castings are small, intricate pieces of precise shape and close tolerance for components such as those used in sewing machines, switches and other equipment requiring precision parts. New areas of design freedom are opened to the engineer. Metals with exceptional resistance to heat, wear and corrosion can be used and many intricate machining operations are completely eliminated.

CREATING THE METALS THAT SHAPE THE FUTURE

V-R VASCOLOY-RAMET

860 MARKET STREET • WAUKEGAN, ILLINOIS

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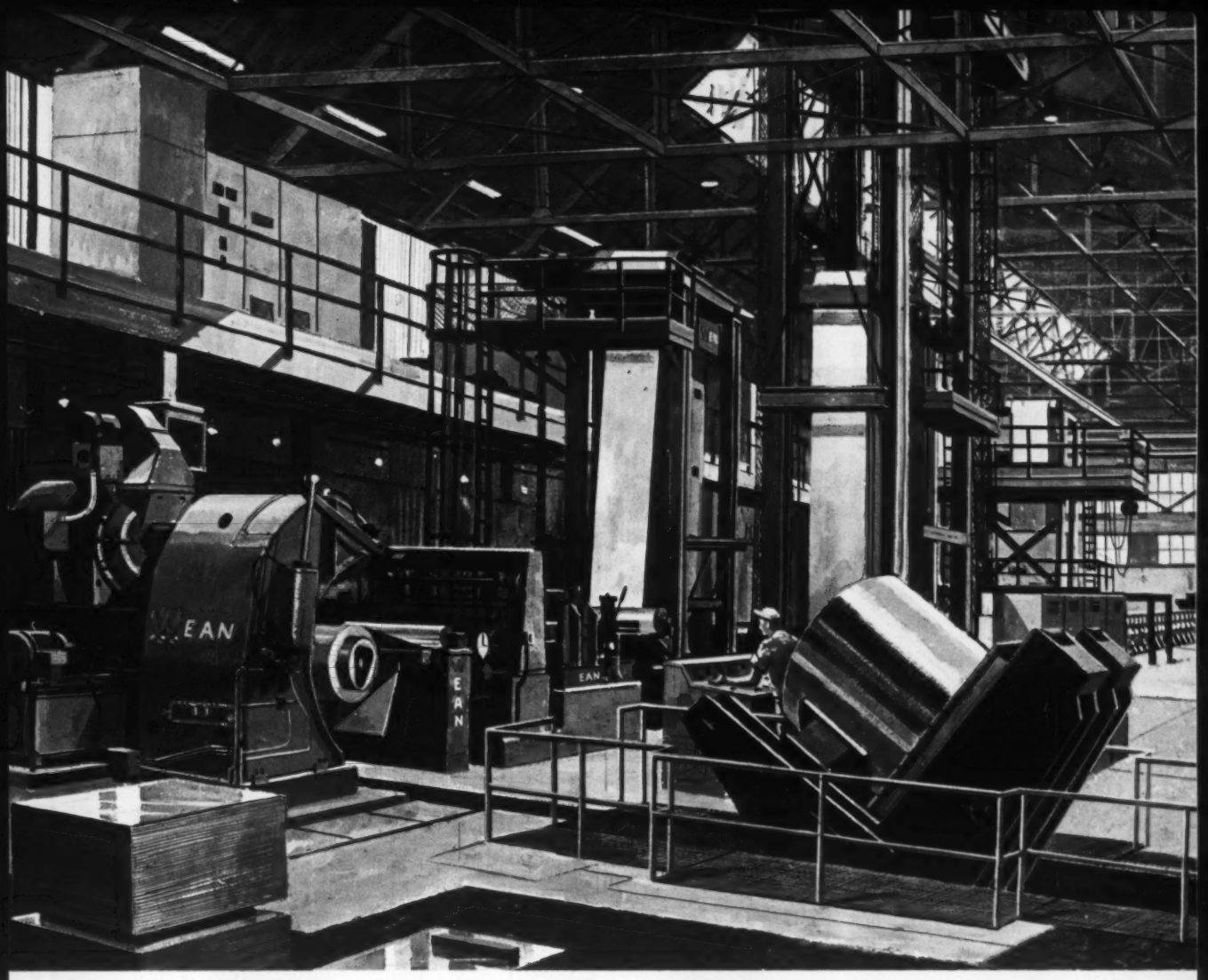

PORTRAIT OF PROGRESS: *Wean No. 2 Alkaline Tinning Line at Granite City Steel Company's Granite City Works*

Granite City Increases its Range of Tin Plate Widths with New Wean Alkaline Line

To supply the full range of coil widths required by the can manufacturing companies it serves, Granite City Steel Company recently installed this Wean alkaline-type tinning line.

Capable of handling coils up to 40,000 lbs. with an outside diameter of 72″, this line is designed to process tin plate at speeds up to 1200 fpm. The line can accommodate strip from 18″ to 38″ in width and from .003″ to .015″ in thickness.

The new Wean line has been designed to economically produce differential plating, providing more versatility in meeting customer requirements. Strip storage is provided in looping towers at both the entry and exit sections of the line in order to maintain constant flow of material through the processing section.

During its three-decade partnership with the steel industry, Wean Engineering Company has designed more than 80% of all electrolytic tinning facilities in operation today. We invite you to put this experience to work on your next tinning line project.

THE WEAN ENGINEERING COMPANY, INC. · WARREN, OHIO

Bearing at left has 1.75" bore, while tandem bearing in main illustration has 17.0" bore. *Yet both are standard, cataloged items.*

Over 400 Cataloged Thrust Bearings
to fit your every need . . .

When you need a thrust bearing, no matter how special, Rollway is ready with the know-how and the precision machinery to design and produce it for you.

Our engineers will gladly consult with you regarding any standard or special-purpose types you need. No cost. No obligation. Rollway Bearing Co., Inc., Syracuse. N. Y.

Complete line of Radial and Thrust Cylindrical Roller Bearings

Select from 7
ROLLWAY
Standard Types

designed, tested and ready for production with load capacities to 4,800,000 pounds.

Ask for Catalog PT-659.

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BEARINGS

ENGINEERING OFFICES:

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STEELMAKING AT JESSOP

Listen...

5...4...3...2...1...0...Lift Off!

The countdown is on.

Scientists and skilled technicians scan their instruments, alert to the least sign of malfunction.

Liquid oxygen has been piped into the fuel chamber of the gleaming Atlas ICBM poised on the launching pad. Other last-minute preparations are completed.

Tension mounts. It won't be long. Listen . . .

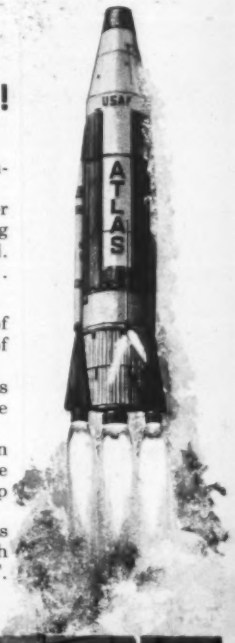
5...4...3...2...1...0...*Lift Off!*

The missile comes to life in a swirling cloud of vapor, exhaust and flame. The engine—capable of 360,000 pounds of thrust—roars thunderously.

Airborne now, the Atlas gathers speed and soars majestically on its predetermined course down the Atlantic range—a successful launching.

Jessop Steel Company makes several alloys used in the Atlas—steels forged and machined into precise but rugged mechanisms. And you will find Jessop steel in the launching pad "plumbing" too.

Swepco Tube Corporation of Clifton, N. J., makes piping for LOX systems that fuel the Atlas with liquid oxygen at temperatures of –300° F. to –320° F. *That's* punishment for any metal.



But Swepco's austenitic chromium nickel Rock-Forged pipe can take it. Ductility—to avoid fracture by reason of brittleness—is an all-important factor in this application.

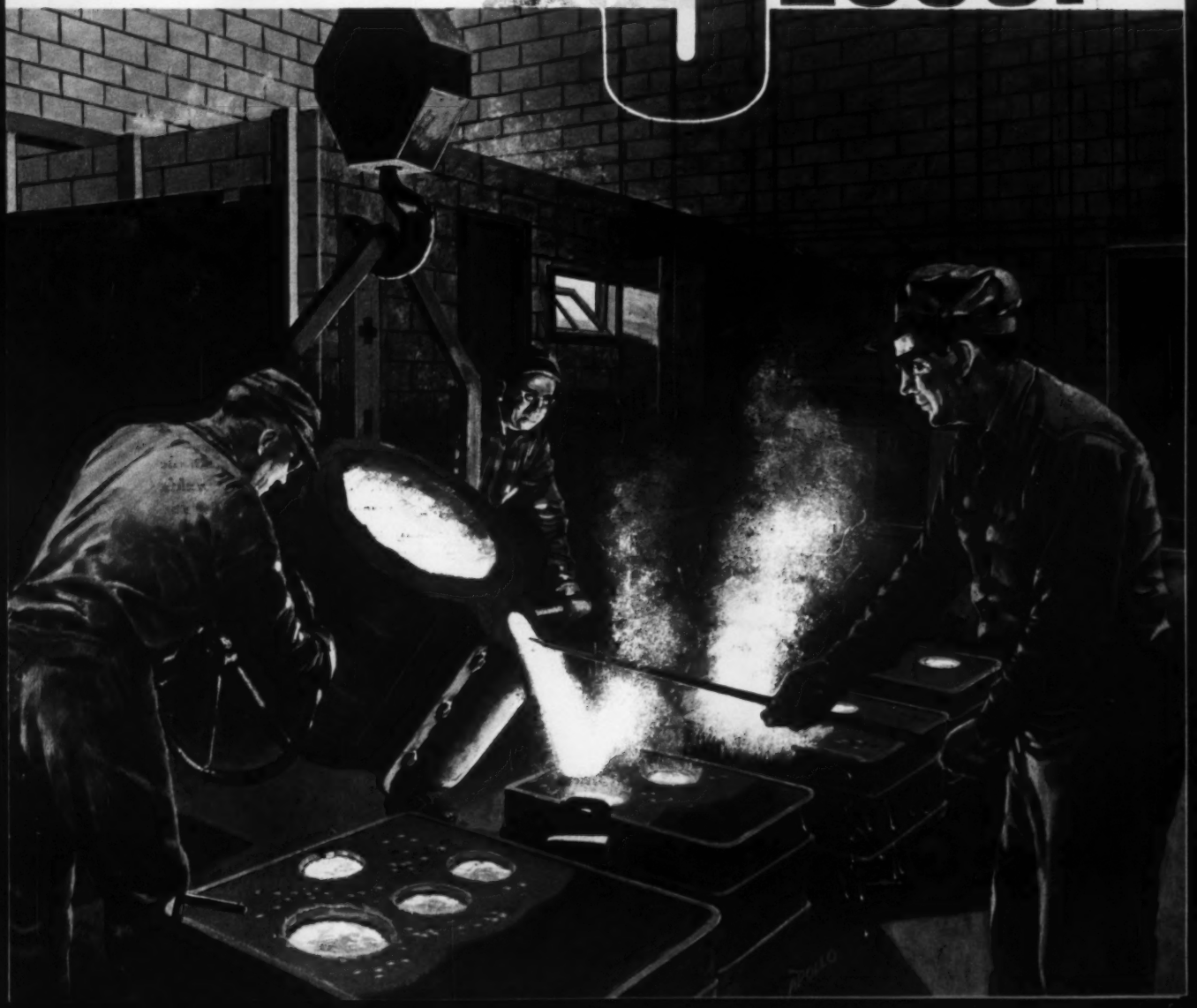
With a value of about 38 foot pounds by Charpy Impact Test, the piping supplied by Swepco handles the job with ease—with an added measure of safety against costly breakdown.

Swepco buys steel from Jessop for rock-forging. Why? Because through controlled chemistry and certain production techniques, Jessop and Swepco developed a steel second to none in workability in the cold forging process.

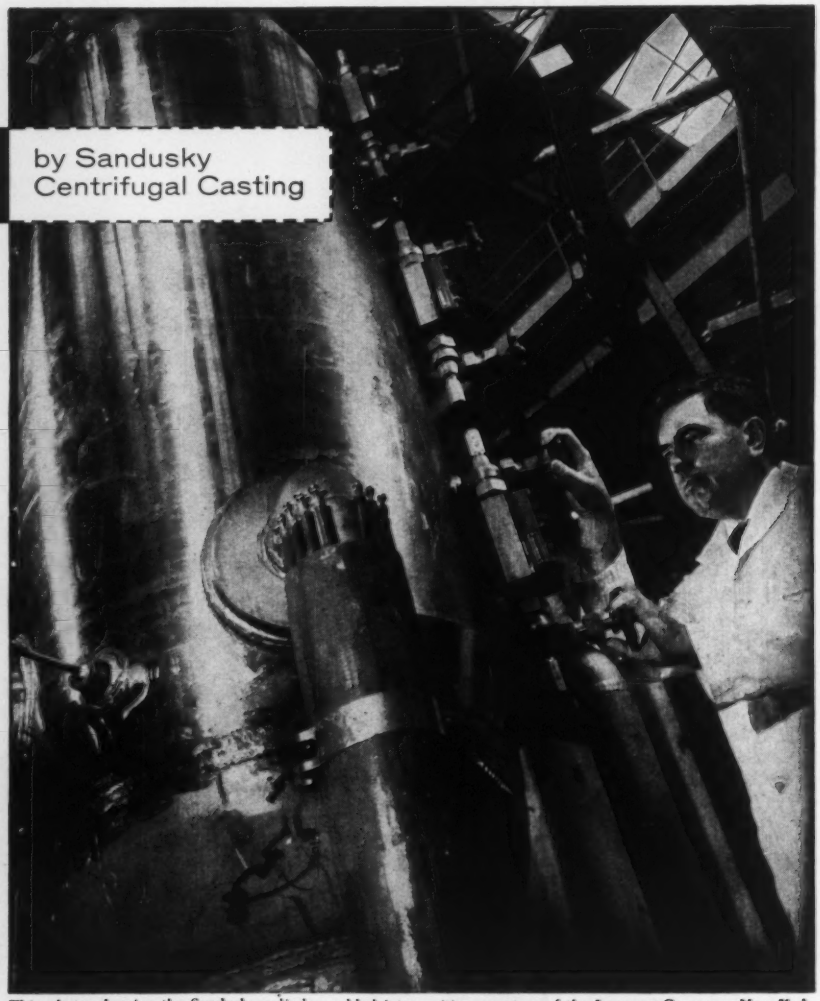
In making steel like this, experience counts . . . and Jessop has it. Call any of Jessop's 23 sales offices in North America and let us prove it to you.

Plants and Service Centers:
Washington, Pa. • Los Angeles • Chicago • Detroit • Owensboro, Ky. • Wallaceburg, Ont.

JESSOP



SOLVED: by Sandusky Centrifugal Casting



This photo, showing the Sandusky cylinder welded into position, courtesy of the Lummus Company, New York. New York who fabricated, assembled and tested the completed loop before shipping it to the ETR site in Idaho.

Nuclear Test Loop Uses Sandusky Centrifugal Casting as Pressurizer Cylinder

A Sandusky Centrifugal Casting is the main cylindrical component of an electrically heated pressurizer, designed by Knolls Atomic Power Laboratory to Section VIII, of the ASME Code (Unfired Pressure Vessels) for use in the new Engineering Test Reactor facilities at Idaho Falls, Idaho.

This 66¼" long cylinder, 27" O.D. with walls 2½" thick, was centrifugally cast of an 18-8 stainless steel (SA-351, Grade CF-8) for the extra corrosion resistance required under nuclear loop service conditions: demineralized water at temperatures to 650°F and pressures to 2500 PSI.

O. G. Kelley Co., Boston, to whom we delivered this 2-ton, fully machined cylinder, welded on the forged heads and nozzles, radiographed the welds, and hydro tested the completed vessel to 4300 PSI.

This is another example of the adaptability of Sandusky Centrifugal Castings to applications demanding the highest order of quality. They may well offer you a practical and economical answer to your cylindrical needs, also.

We are producing cylinders and piping in diameters from 7" to 54"—in lengths to 33 ft.—in a wide range of ferrous and non-ferrous alloys. Write for Bulletin 300, for more complete technical information on the Sandusky process and product application data.

SANDUSKY CENTRIFUGAL CASTINGS

FOUNDRY & MACHINE CO.

SANDUSKY, OHIO—Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

Help Wanted

Sir—We have a problem! We are trying to obtain some sort of an infra-red device for detecting hot spots on stacks. It would be something similar to the snooperscope used in the armed services. However, the cost has to be around $100. To date we haven't found anything that remotely resembles our needs. Can any of your sleuths help us out?—Algird C. Pocius, Colorado Fuel & Iron Corp., P.O. Box 316, Pueblo, Colo.

▪ **Can any reader help?—Ed.**

Missing Mountaineers

Sir—We liked your recent "Citizen's Report." There's only one thing you left out: 350,000 starving West Virginia mountaineers. They must have all starved to death because we don't hear anything more about them.—William A. Boesche, president, The Ornamental Iron Work Co., Akron, O.

Pleasure

Sir—I would like to express my pleasure in reading your editorial in the Feb. 23 issue of The IRON AGE "Citizen's Report." It is my privilege to be president of the Lima area Chamber of Commerce and I would appreciate your permission to reprint this editorial in our monthly bulletin.—Joe E. Berk, Lima Iron and Metal Co., Lima, O.

▪ **Permission granted.—Ed.**

Depreciation Notes

Sir—When I read your editorial on depreciation in the March 9 issue ("Better Do It Yourself: Uncle Sam Won't Help Much") I decided to write and inform your readers not to take seriously all this writing about depreciation. Anyone in the type of business we are identified with knows depreciation full well. What they may not know, however, is the policy of a revenue branch of the government, namely: They will step into your establishment, mark up your equipment which had been depreciated over a period of ten years, and inform you blandly that it is still worth so much and that you owe ten thousand dollars or more. It is a predatory procedure, but what is the small businessman going to do, or what can he do about it?—C. A. Mayer, president, Precision Tool & Manufacturing Co., Inc., Westfield, Mass.

Wrong Image?

Sir—How can The IRON AGE justifiably give emphasis to the domestic steel producers concern over steel imports and at the same time accept a full page ad (that mentions the export of steel) from the steel company Hitachi, Ltd. of Japan? —N. J. Nicksich, U. S. Steel Corp., Gary, Ind.

▪ **There are many problems here, including the need for special protection in critical areas. But let's put it this way—if national policy favors world trade it can't be a one-way street.—Ed.**

"I'm sorry, Benson, but if I gave you the day off, I'd have to do the same for everyone else whose wife had quadruplets."

think again

If you think that fasteners are "chicken feed", think again. Your costs mount up when you use faulty fasteners that slow down and stop assembly operations, or cause damage to materials and tools.

Why not buy quality fasteners in the first place, and then your fastener costs will really be "chicken feed".

Order Southern Screws from your distributor, or write direct to Southern Screw Company, P. O. Box 1360, Statesville, North Carolina.

Over 1,500,000,000 pieces in stock at factory and main warehouse in Statesville, N. C.

WAREHOUSES:
New York • Chicago • Dallas • Los Angeles

Machine Screws & Nuts • Tapping Screws • Stove Bolts • Drive Screws • Carriage Bolts • Continuous Threaded Studs • Wood Screws

Southern SCREW COMPANY
STATESVILLE • NORTH CAROLINA

6 WAYS TO SAVE MONEY
IN YOUR DEGREASING OPERATION

...from the makers of COLUMBIA-SOUTHERN TRICHLOR

1. Keep your solvent in the machine

Your solvent can't clean much metal when it's floating around in the air. Prevent drafts which remove solvent. Check open doors, windows and location of fans. Keep cover on unit during idle periods—solvent evaporates whether it's hot or cold.

2. Don't waste heat

By keeping your heating and condensing coils clean, you can operate your equipment at the design rate and thus control resultant waste of solvent and heat. Make sure the thermostats are kept clean and functioning properly.

3. Make sure your solvent is formulated for the job

Columbia-Southern Trichlor contains a special neutral stabilizer which enables it to stand up under continuous operation with high contamination rates. Trichlor's stabilizing system is designed specifically to permit you to handle aluminum as well as other metals safely in the degreaser.

4. Establish good cleanout procedures

Keep an eye on sump temperatures, and distill in time to avoid excessive contamination and low heat transfer. You not only get more efficient operation, but you may also save your equipment and reduce operating costs.

5. Protect equipment investment with scheduled maintenance

Schedule routine maintenance on valves, pumps, piping, gaskets and water separator; regular attention to little items prevents emergency repairs to the whole system.

6. Keep down dragout losses

Handle and rack your work properly. We often find that the type, shape and weight of parts going through machines are not given proper consideration. Liquid solvent may be trapped or vapor levels dropped as a result. A review of these factors, plus location of sprays, and throughput speed can reduce waste by a healthy figure.

These simple but effective rules have been developed by the Technical Service group at PPG's Chemical Division, as a result of hundreds of service calls and years of experience in applying Columbia-Southern TRICHLOR to degreasing operations.

Trichlor is built for the job, starting with a "triple-check" quality control system during manufacture. The stability, uniformity and purity of Trichlor are guarded by the blending in of carefully compounded *neutral* stabilizing agents which maintain the solvent in a safe, effective state through the toughest service.

Save money in your vapor degreasing operation by following the six rules above and specifying Columbia-Southern Trichlor. Call your nearby Trichlor distributor or the Columbia-Southern office serving your area.

columbia | southern chemicals
CHEMICAL DIVISION
PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER PITTSBURGH 22, PENNSYLVANIA
DISTRICT OFFICES: Boston · Charlotte · Chicago · Cincinnati · Cleveland Dallas · Houston · Minneapolis · New Orleans · New York · Philadelphia Pittsburgh · San Francisco · St. Louis · IN CANADA: Standard Chemical Limited

Metals Handbook

Bigger and better. That's the way to describe the new edition of the Metals Handbook of the American Society of Metals.

The 8th edition, being distributed to ASM members, represents the contributions of more than 1300 metal specialists. According to ASM, it contains six times the numerical information (charts, graphs and tables) as the 1948 edition.

Tied to Needs—This time, Editor Taylor Lyman reports, special emphasis has been placed on relating metals information to engineering and production practice.

There are more first-hand examples and comparisons, over 1500, in the current 1300-page volume. It contains more than 2.5 times as many pages on the selection and properties of metals as the previous edition.

The new Handbook is the first of a series which will cover all branches of metals engineering and metalworking, Dr. Lyman notes. It analyzes the problems of metals selection in terms of three principal criteria: Specific engineering properties, fabricability, and cost.

Other Features—There's an enlarged section on carbon and low-alloy steels including 12 articles on steel products and 14 on metal selection for specific engineering properties, economy, and special processing considerations.

Included in this section are articles covering all commercial steel product forms. Also included are articles dealing specifically with selection for maximum yield strength at minimum cost, hardenability, fatigue resistance, notch toughness, wear resistance, and resistance to corrosion.

Other major sections of the book cover cast irons, stainless steels and heat-resisting alloys, tool materials, nonferrous metals, and magnetic, electrical and other special-purpose materials.

Price of the Handbook to nonmembers is $30. It can be ordered from the American Society for Metals, Metals Park, Novelty, Ohio.

ASM HANDBOOK EDITOR: Dr. Taylor Lyman is the editor of the new ASM Handbook, Volume I which is described in the article above.

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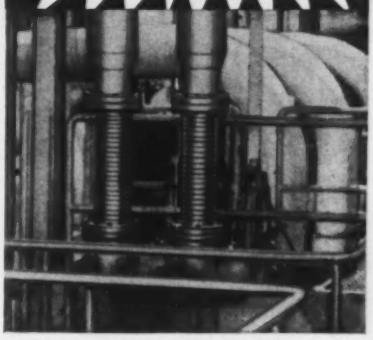

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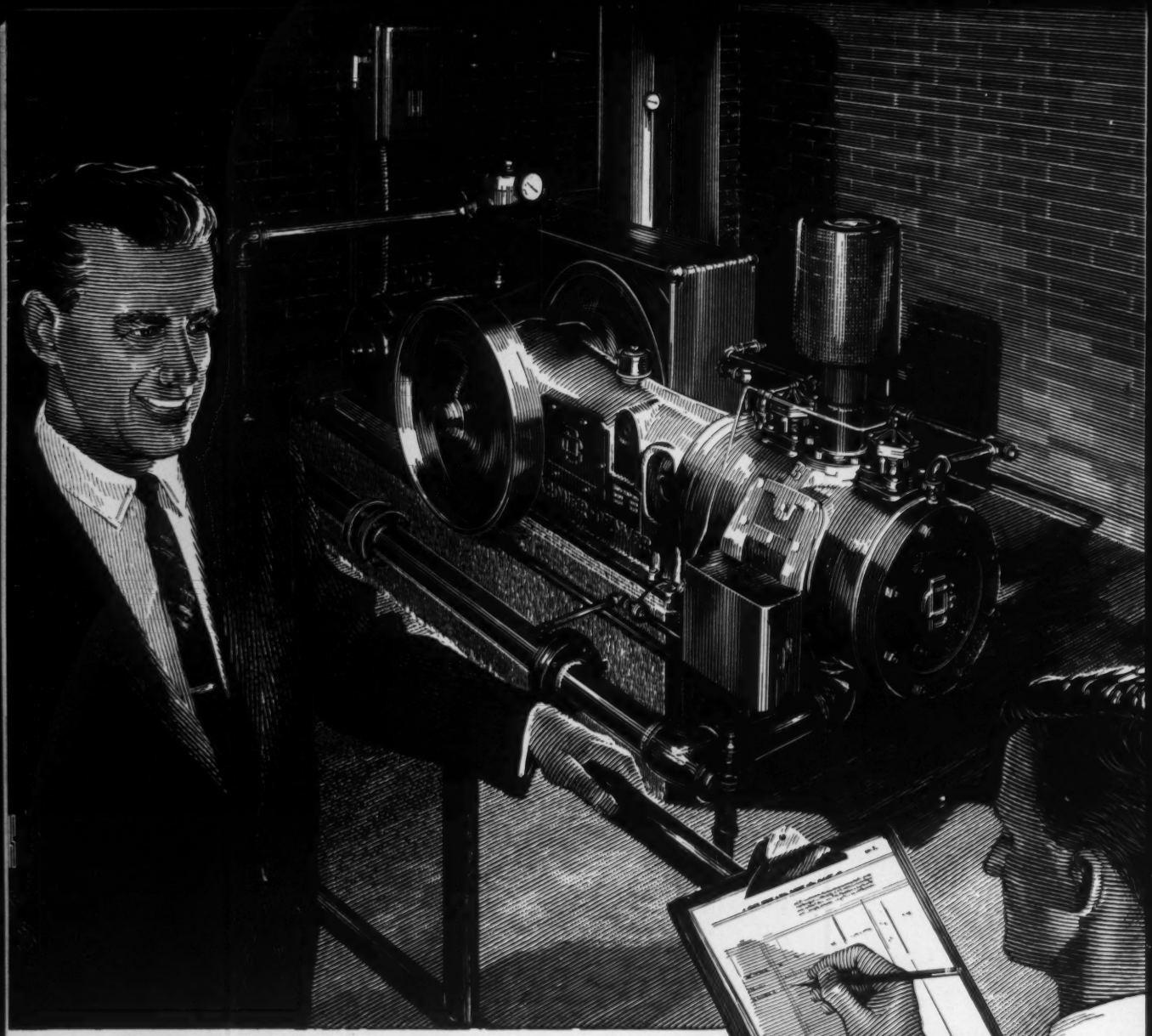

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COMING EXHIBITS

Western Metal Show — March 20-24, Pan Pacific Auditorium, Los Angeles, (American Society for Metals, Metals Park, Novelty, O.)

National Packaging Show — April 10-13, Lakefront Exposition Hall, Chicago. (American Management Assn., 1515 Broadway, Times Square, New York 36.)

Welding Show — April 17-21, New York Coliseum, New York. (The American Welding Society, 33 West 39th St., New York 18.)

Business Equipment Exposition— April 17-21, New York Coliseum, N. Y. (Office Equipment Mfg. Institute, 777 Fourteenth St., N. W., Washington, D. C.)

Powder Metallurgy Show — April 24-26, Hotel Sheraton - Cleveland, Cleveland. (Metal Powder Industries Federation, 60 E. 42nd St., New York 17.)

Castings Show—May 8-12, Brooks Hall, San Francisco, Calif. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Design Engineering Show — May 22-25, Cobo Hall, Detroit. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

MEETINGS

APRIL

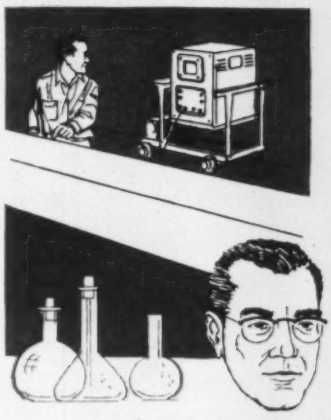
National Assn. of Architectural Metal Manufacturers—23rd annual convention, Apr. 9-14, Plaza Hotel, New York, N. Y. Assn. headquarters, 228 North LaSalle St., Chicago 1, Ill.

The Metallurgical Society of AIME—National Openhearth Steel Conference, Apr. 10-12, Sheraton Hotel, Philadelphia. Society headquarters, 29 West 39th St., New York.

American Institute of Electrical Engineers — Biennial conferences on electric heating, Apr. 11-12, Sheraton-Lincoln Hotel, Indianapolis, Ind. Institute headquarters, 33 W. 39th St., New York 18.

(Continued on P. 34)

METALLURGIST REPORTS:



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". . . ultrasonic tests show complete ingot soundness . . . macro-etch tests show good quality . . . chemical analysis of the ingots are in line with ladle analysis of the heats."

A trial run in your plant will prove beyond question, you'll get sound steel and MORE OF IT with Soffel's Exothermic Sideboards.

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PRODUCT ADVANTAGES

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time saving: The Gray Space-Setter system readout provides a basic and infallible counting or measuring system. The zero offset feature establishes zero readout at any pre-determined reference point on the workpiece. Operator can read drawing dimensions on panel.

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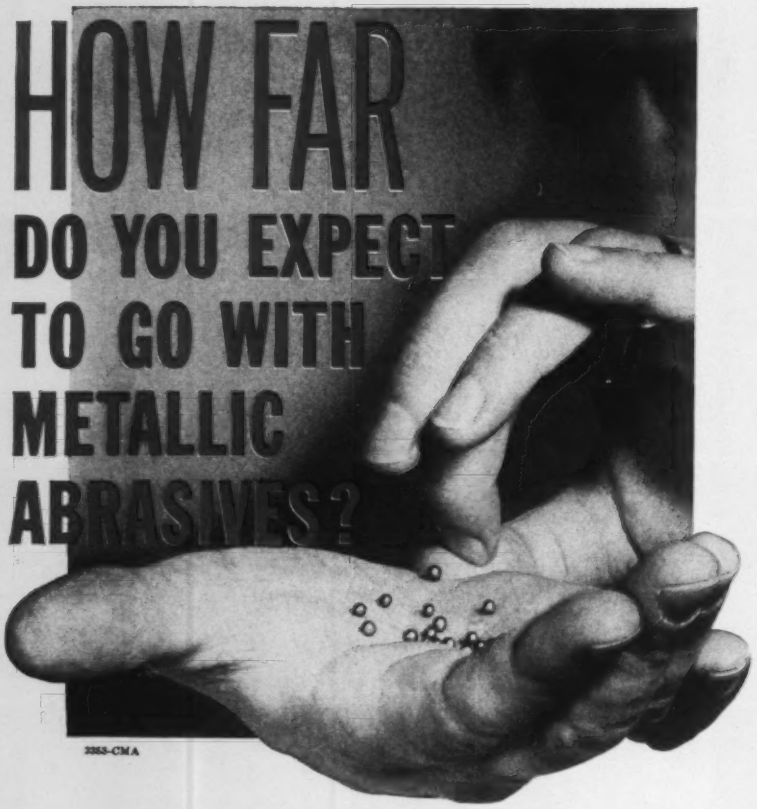

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MEETINGS

(Continued from P. 31)

Steel Shipping Container Institute, Inc.—Annual meeting, Apr. 11-13, Kenilworth Hotel, Miami Beach, Fla. Institute headquarters, 600 Fifth Ave., New York.

American Society of Lubrication Engineers — Annual meeting and exhibit, Apr. 11-13, Bellevue-Stratford, Philadelphia. Society headquarters, 5 N. Wabash Ave., Chicago.

Copper & Brass Warehouse Assn., Inc.—Annual meeting, Apr. 11-14, Colorado Springs, Colo. Association headquarters, 1900 Arch St., Philadelphia.

Rail Steel Bar Assn. — Annual meeting, Apr. 17-18, Biltmore Hotel, New York. Association headquarters, 38 S. Dearborn St., Chicago.

American Welding Society—Annual meeting, Apr. 17-21, Commodore Hotel, New York. Society headquarters, 33 W. 39th St., New York 18, N. Y.

Scientific Apparatus Makers Assn.—Annual meeting, Apr. 23-27, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, 20 N. Wacker Dr., Chicago.

International Acetylene Assn.—63rd anniversary convention, Apr. 24-25, Sheraton-Plaza Hotel, Boston Assn. headquarters, 270 Park Ave., New York 17, N. Y.

Assn. of Iron & Steel Engineers—Spring conference, Apr. 24-26, Jefferson Hotel, St. Louis, Mo. Assn. headquarters, 1010 Empire Bldg., Pittsburgh, Pa.

Society of the Plastics Industry, Inc.—18th annual western section conference, Apr. 26-28, Hotel del Coronado, Coronado, Calif. Society headquarters, 250 Park Ave., New York 17, N. Y.

National Screw Machine Products Assn. — Annual industry meeting, Apr. 30-May 3, Somerset Hotel, Boston, Mass. Assn. headquarters, 2860 E. 130th St., Cleveland, O.

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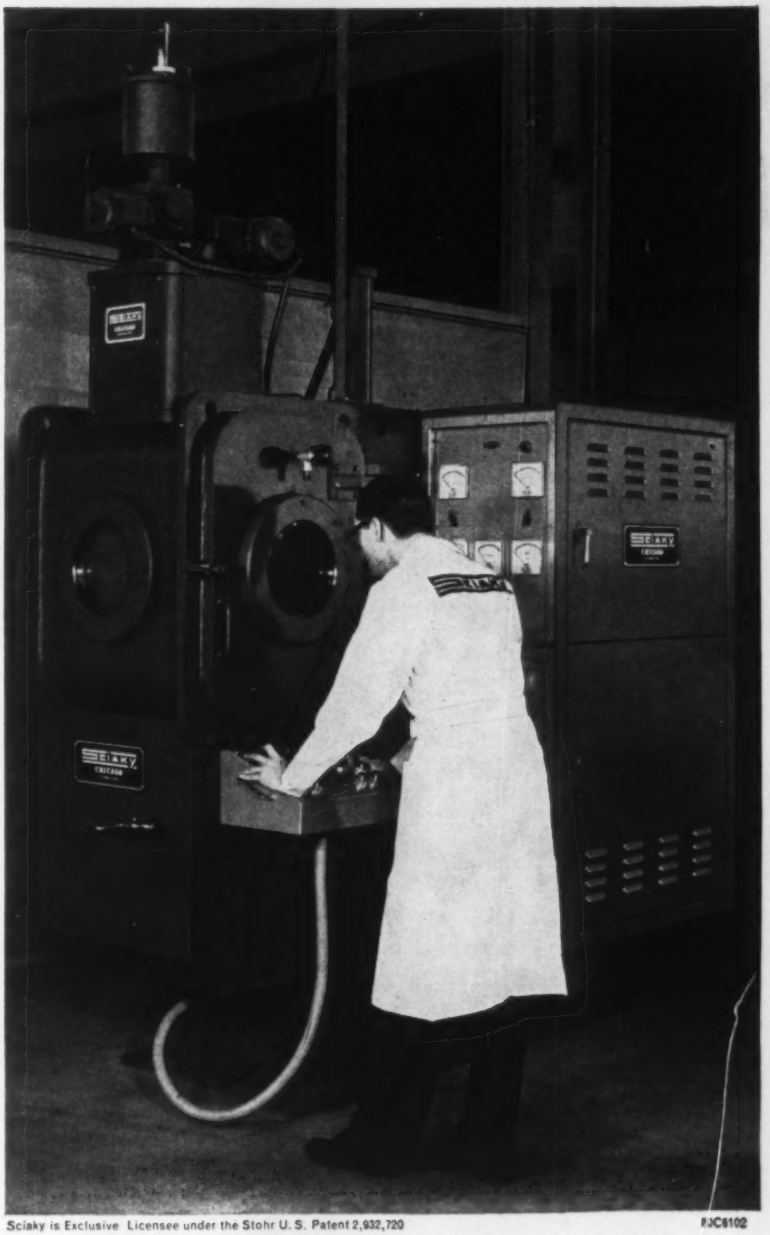
Call or write for details of these and other Sciaky machine features. Regardless of your specific area of interest, you'll find Sciaky's combination of extensive welding experience and advanced electron beam technology to be helpful.



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ROCHESTER, NEW YORK
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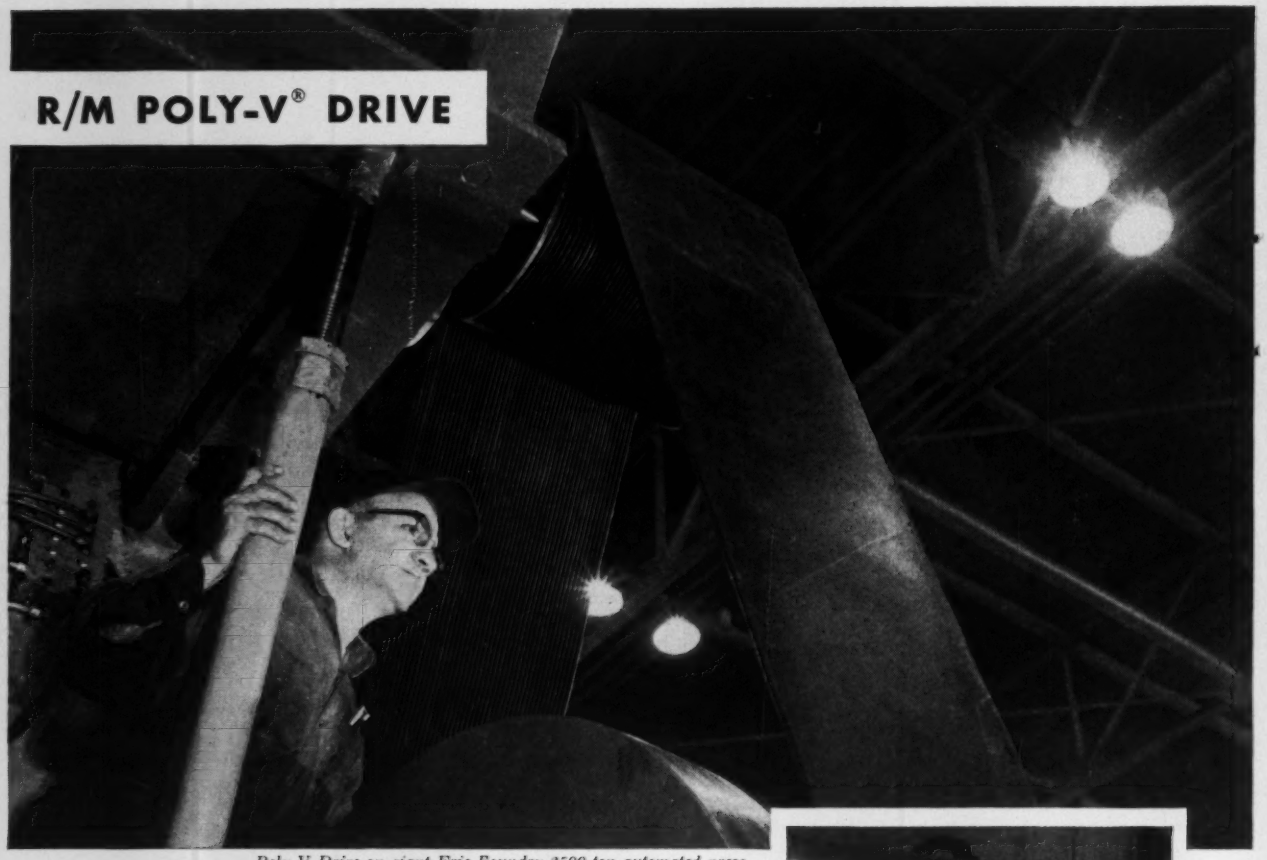

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Rugged POLY-V® DRIVE Delivers More Power in Less Space... with More Reliability

R/M Poly-V Drive employs a *single*, endless V-ribbed belt across full width of sheaves with mating grooves. All parts of the belt work *together* to increase drive capacity—deliver more horsepower per inch of drive width than ever possible with conventional multiple belt drives. Only Poly-V* offers these exclusive advantages:

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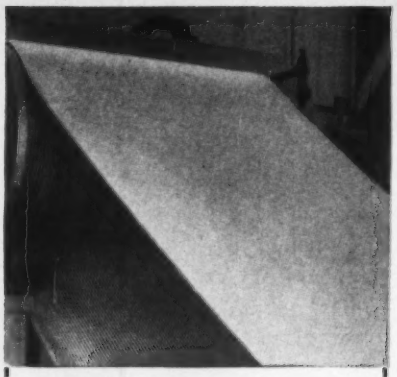

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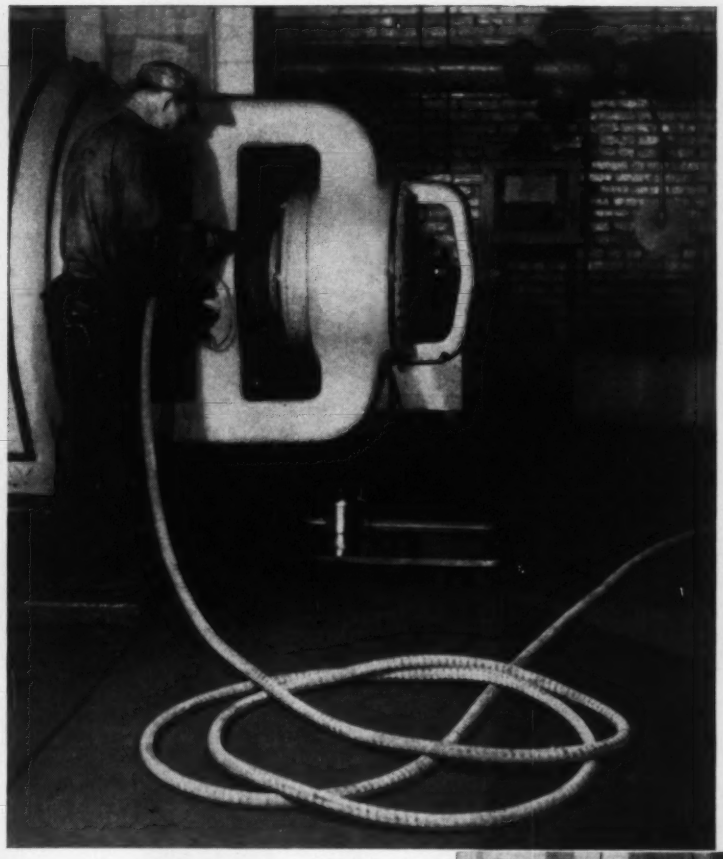

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Easiest handling hose made for use with air tools. Homoflex is strong, flexible . . . yet *weighs less* than any other hose for equal working pressure. Homoflex is also made in types for water, other fluids and gases.

- **Super-Strong**—assures longer, trouble-free service life
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- **Mandrel-Made**—no pre-set twist
- **Kinkless**—coils and uncoils freely in any direction
- **Homogeneous Construction**—provides inseparable tube-to-cover bond
- **Safer, Easier To Couple**—inside and outside diameters are uniform

Let an R/M distributor show you the advantages of Homoflex and other R/M hose constructions for *your* service requirements. Write for Catalog M5.

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Ray-Man has the flexibility and troughability to haul fuller loads—even with small pulleys, reverse bends, snub or take-up pulleys. Compare its exclusive advantages:

- **High Cover-Adhesion All Around**—top, bottom, and edges
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- **Operates on Smaller Pulleys**
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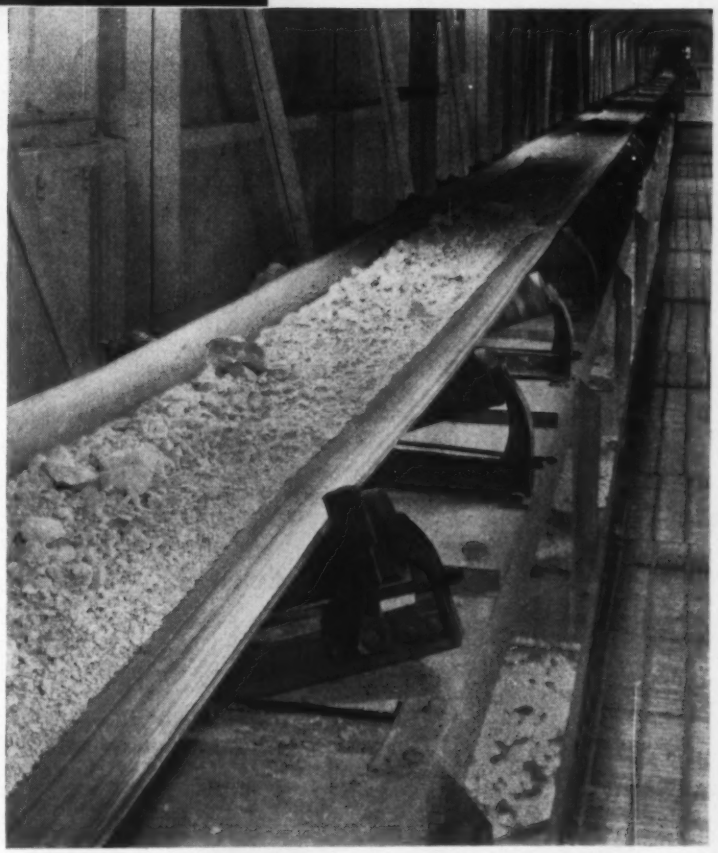
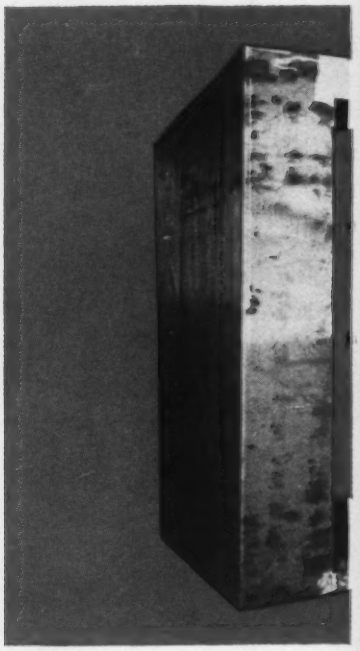
R/M's exclusive "XDC" Cover gives *extra* protection against wear and tear. Talk to your R/M distributor . . . or write for Bulletin M302.

RM134



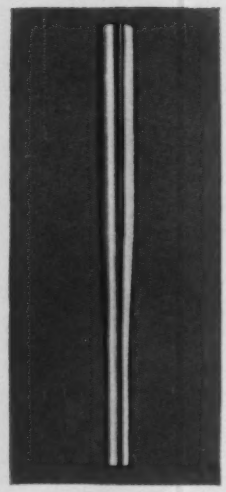


How METALOGICS* cools off the high-cost hot seat!

The following case histories are typical of how Ryerson Metalogics helps hundreds of companies save money, improve products, and cut production waste.

Metalogics-trained Ryerson specialists help you value-analyze cost-soaring production problems—and they back up their suggestions with unbiased recommendations on exactly the right steel, aluminum or plastic to do each job best for less.

Little wonder, then, that more and more companies across the country find the high-cost hot seat a little cooler after inviting a Ryerson man to value-analyze specific problems, and come up with recommendations. Give him a call—perhaps he can help answer some of your high-cost questions.



*METALOGICS—the Ryerson science of giving optimum value for every purchasing dollar.

PRODUCTION COSTS REDUCED 40%

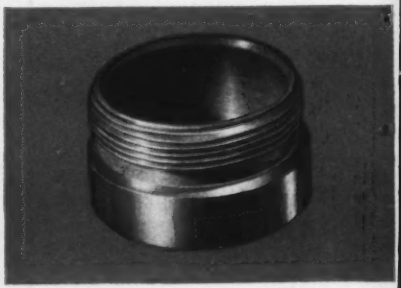
Company was making chrome-plated table legs as a 3-piece weldment and having problems in holding concentricity and making proper preparation for the mirror finish. In addition, production costs were high.

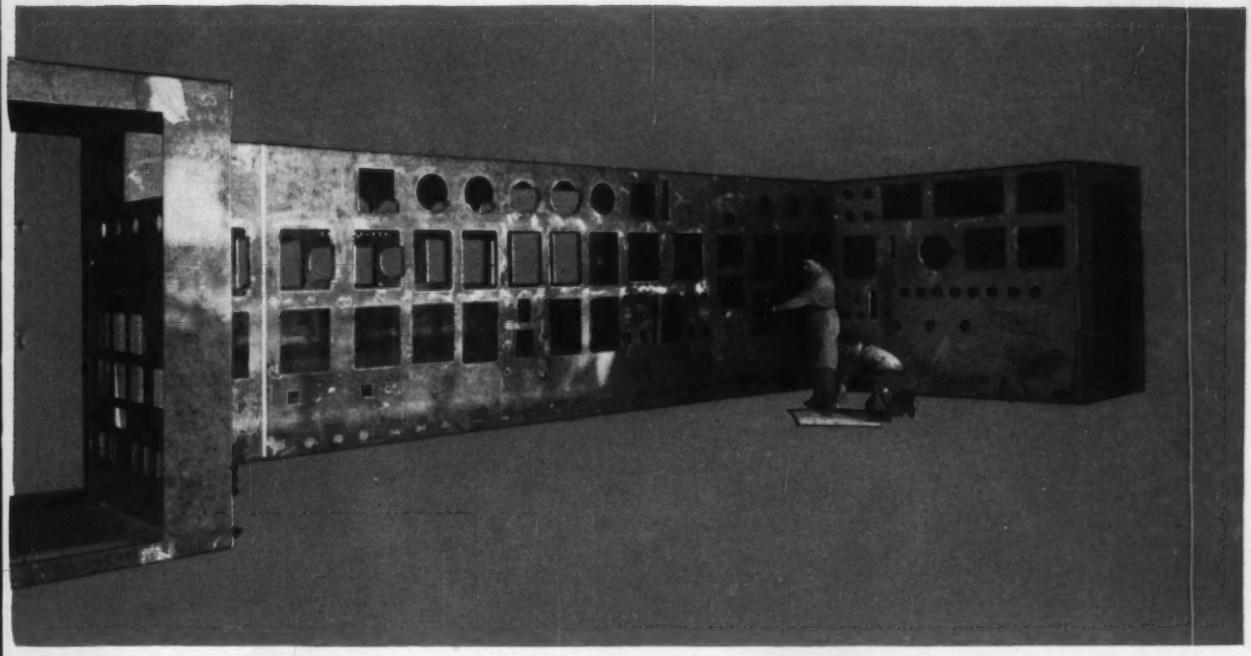
Ryerson recommended this Metalogical solution: make the legs from *one* piece of 3″ O.D. soft-annealed, cold rolled, electric-welded tubing—half the length tapered to 2″ O.D., holding concentricity to 1/32″. Results: surface was just right for chrome plating, and production cost reduced.

THREAD GALLING ELIMINATED

Manufacturer made this special coupling of aluminum to gain the advantages of light weight, corrosion resistance and easy machining. But a problem developed due to galling of threads.

Following the recommendation of a Ryerson Metalogics specialist, the company hard-coated the parts by special low-temperature anodizing which produced a surface hardness of Rockwell 70 C. Galling was eliminated, and corrosion resistance increased. One more example of top technical help from Ryerson.

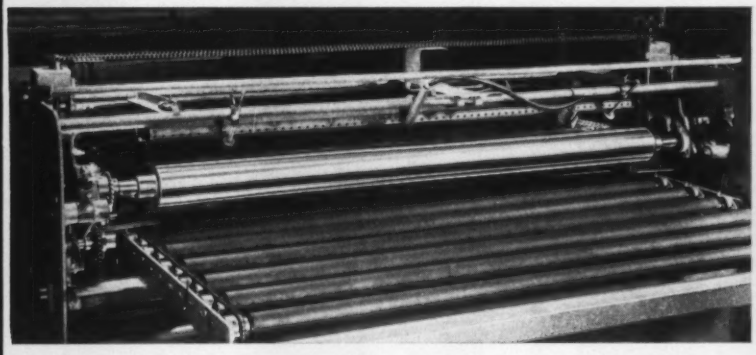




150 OPENINGS BURNED IN HUGE CONTROL PANEL ASSEMBLY

Expert Ryerson flame-cutters burned more than 150 openings in the steel plates that make up this huge control panel assembly.

Each opening had to be located and cut with extreme accuracy to permit proper installation of the complex instrument system. Distortion had to be carefully controlled and a high degree of flatness maintained so that the plates would have a good appearance when painted. All such requirements were readily met by Metalogically-oriented Ryerson service.



One end of close-tolerance roll. Note 3-step machining of bar.

SWITCH TO LEDLOY® STOPS TEARING...CUTS REJECTS

In making this roller coater—Gasway Corp., Chicago—was having trouble machining C-1018 bar stock to produce a close-tolerance roll. Three-step machining was required at both ends of the bar, and tearing was frequent with up to five stops per cut to regrind the tool.

After studying the problem carefully, their Ryerson specialist recommended a change to Ledloy 300. Results from this fast-machining leaded steel: higher production; longer tool life; rejects cut to a minimum.

Other steels for this coater, including angles, expanded metal, and cut-to-size side plates, are also supplied by Ryerson.

As P. A. Bill Vastine puts it, "Time and time again Metalogics takes me off the spot. It gives me technical help, plus convenient, dependable, single-source service on all my requirements."

RYERSON METALOGICS

JOSEPH T. RYERSON & SON, INC., MEMBER OF THE INLAND® STEEL FAMILY

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More and more, manufacturers are finding that their best source of extruded products is their nearby independent fabricator.

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Another reason is his size . . . your business is important to him. He'll go all out to bring his many years' experience to the solution of your problems . . . to give you the quality, personalized service and unit cost that assure your repeat orders. Supplied by Aluminium Limited, your independent fabricator is backed by the research facilities of one of the world's leading aluminum producers.

Ask your aluminum extruder to estimate on your next order for semi-fabricated parts. You'll find him eager to give you the finest aluminum products at reasonable cost. Or, if you prefer, ask us to send you a list of independent aluminum extruders near your plant.

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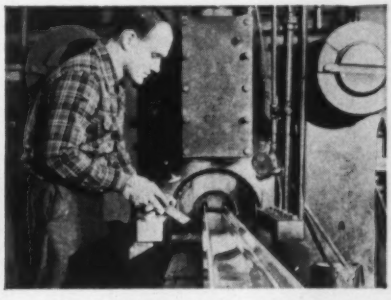
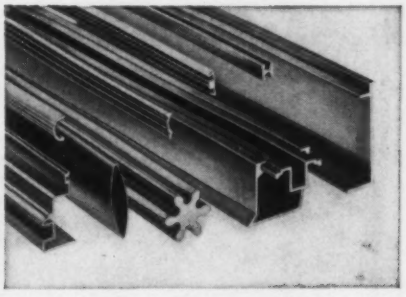


Modern equipment. Investigate the facilities offered by your aluminum fabricator—you'll find him well equipped to serve you. His facilities, experience, location, and his personalized service make him your best source of semi-fabricated aluminum products.



Any shape . . . the right alloy. Your nearby extruder can turn out aluminum in a wide range of shapes to meet your most exacting requirements. He also works with you in choosing from a variety of aluminum alloys formulated by Aluminium Limited.

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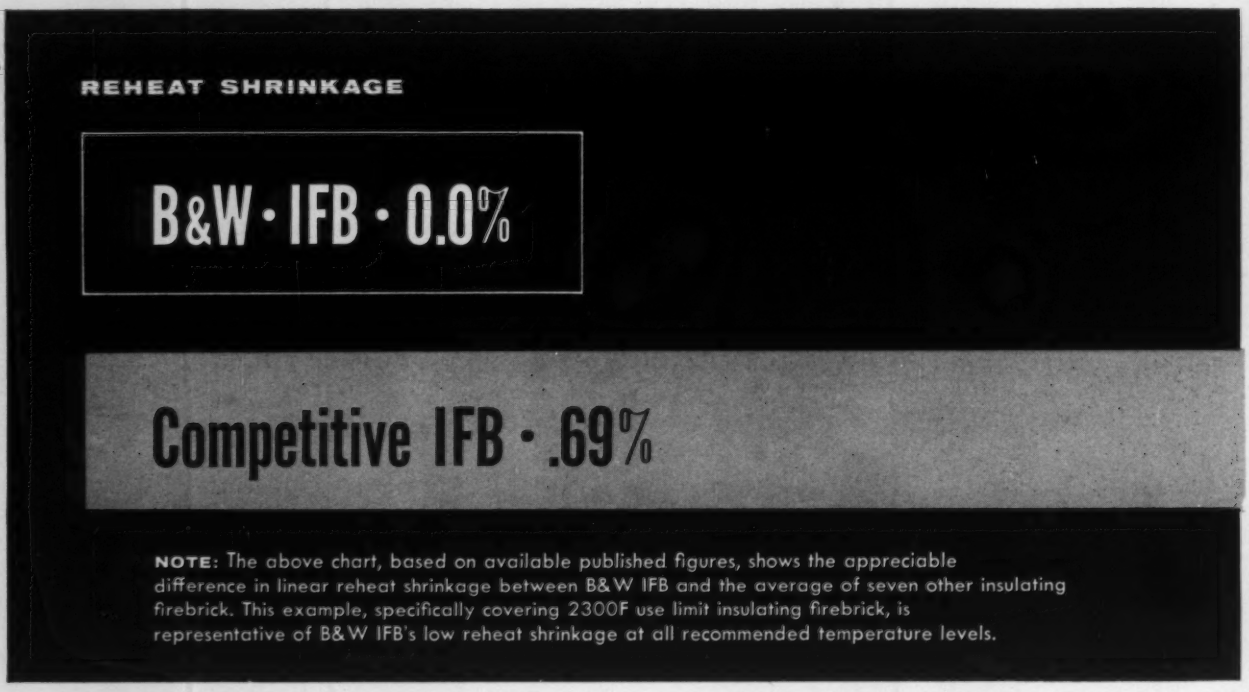
Another *plus* of Lightweight B&W Insulating Firebrick

LOWER REHEAT SHRINKAGE means MORE STABLE


REHEAT SHRINKAGE
B&W · IFB · 0.0%
Competitive IFB · .69%
NOTE: The above chart, based on available published figures, shows the appreciable difference in linear reheat shrinkage between B&W IFB and the average of seven other insulating firebrick. This example, specifically covering 2300F use limit insulating firebrick, is representative of B&W IFB's low reheat shrinkage at all recommended temperature levels.

All insulating firebrick are not the same. Published figures show wide variations in *all* of the important properties among the leading brands of brick.

Take reheat shrinkage. This important property affects furnace stability, refractory life and fuel costs. Reheat shrinkage ranges from a B&W Insulating Firebrick low of 0.0% to a high of 1.5% for competitive insulating firebrick. The closest any other IFB comes to matching B&W IFB is 0.3%.

You are paying for insulating firebrick . . . make sure you get *all* the benefits. B&W—the originator of IFB—manufactures a full line of IFB with an experience-proved balance of light weight, high insulating value, high strength and long life.

For complete information on B&W Insulating Firebrick, write for Catalog R-38 to The Babcock & Wilcox Company, Refractories Division, 161 East 42nd Street, New York 17, New York.

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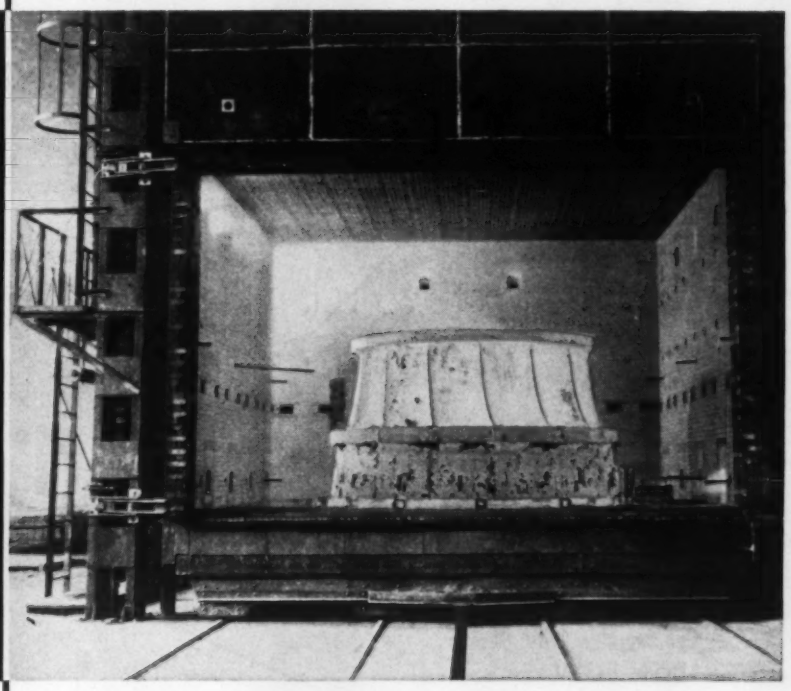
FURNACE CONSTRUCTIONS

the payoff



Stability means low maintenance —

This large car bottom annealing furnace has given years of low maintenance service because of the stability of B&W Insulating Firebrick. Furthermore, the high insulating properties of B&W IFB have resulted in lower fuel costs and close temperature control. This is just one of many proofs in our files that "there is an important difference in insulating firebrick."

R-660

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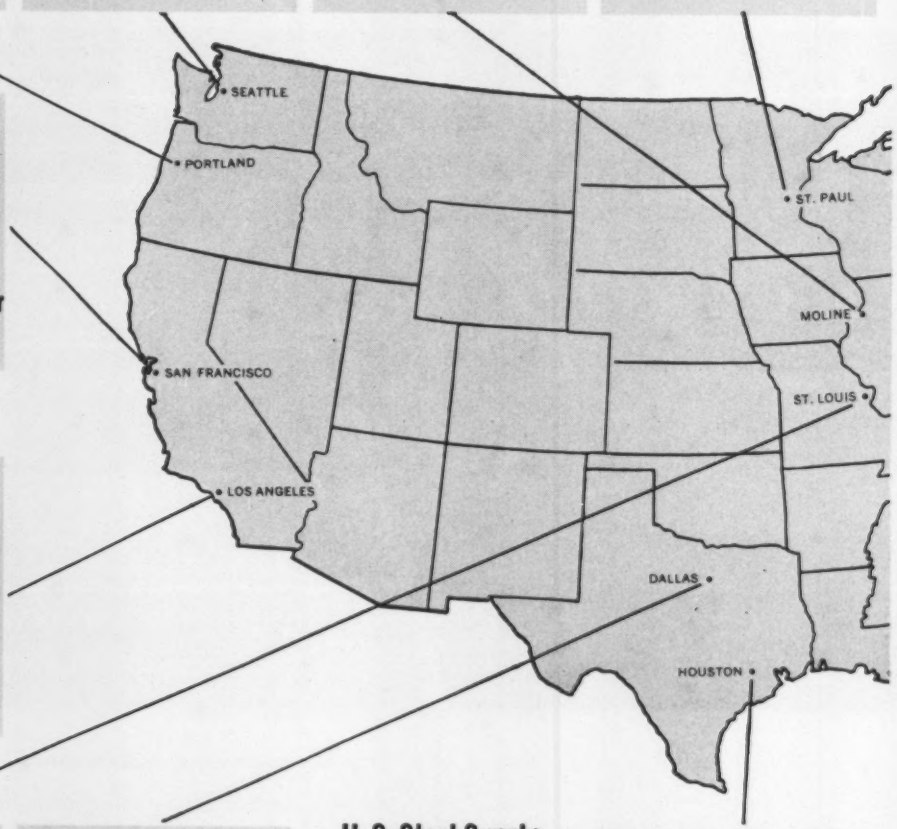

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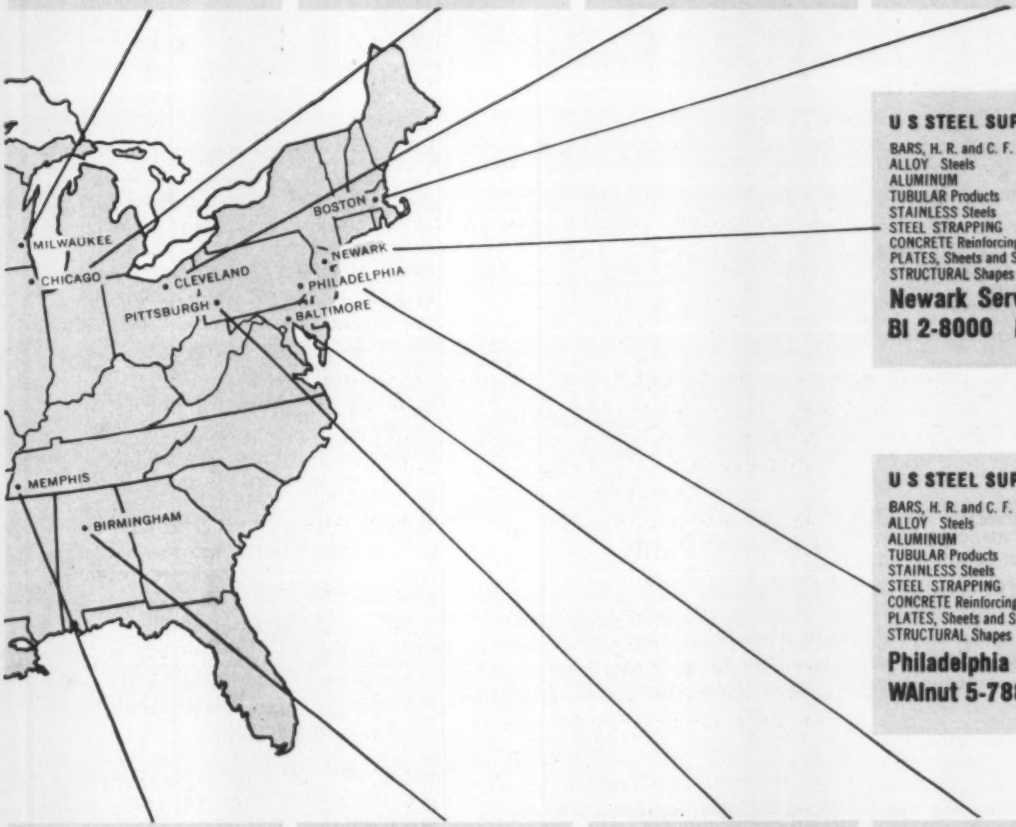

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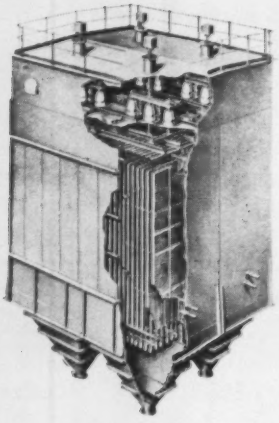
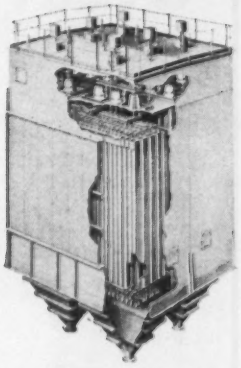
How Important Is Precipitator Size?

Traditional Design →





Modern Design ←

As shown in these two illustrations, Research-Cottrell's more compact modern design is appreciably smaller than the traditional design.

A common fallacy assumes a larger precipitator with lower gas velocity is preferable to a smaller precipitator with higher gas velocity.

This assumption overlooks important economies now obtained with:

(a) Efficient voltage application.

(b) Specific control of electrical sections.

(c) Electrode design improvements.

(d) Automatic Rapper Control.

(e) Accurate internal baffling.

(f) Proper control of gas flow, based on three-dimensional model studies.

Close familiarity with these techniques and improvements has made possible guarantees of 99 per cent collection on large, modern installations.

A. Applied Voltage

The relationship between voltage and size of the precipitator is approximately as shown in Figure 1.

Most efficient operation and minimum size are obtainable by insuring operation at maximum voltage under varying conditions of gas flow, particle size, resistivity, etc. Generally, the amount of arc-over in the precipitator will determine the practical operating voltage limit. By using the arc-over as the motivating control factor, through measurement and integration, maximum voltage can be insured at all times.

B. Sectional Voltage Control

Since gas conditions vary throughout any precipitator, higher efficiencies are obtainable if the precipitator is sectionalized with individual voltage control for each section.

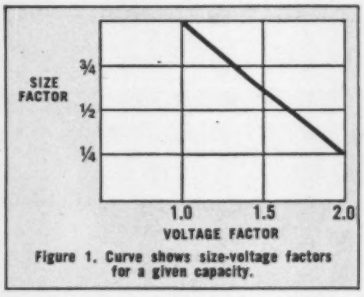


Figure 1. Curve shows size-voltage factors for a given capacity.

C. Electrode Design

Efficiency can be seriously affected by re-entrainment (that is the re-suspension of dust that has already been collected). Properly designed collecting electrodes, or plates, providing correct baffling to shield the collecting surface against the sweeping and scouring effects of the gas stream can reduce overall precipitator size 25–50 per cent.

D. Automatic Rapper Control

Rapping intensity must vary to meet the changing conditions of gas flow, particle size and resistivity. Otherwise, efficiency will decrease due to either too heavy a blow causing a re-entrainment, or too light a blow allowing dust build up on the electrodes necessitating operation at reduced voltages. Automatically controlled, fully adjustable rapping equipment insures optimum operation at all times.

E. Internal Baffling

Maximum efficiency can only be obtained by reducing the sneakage (part of gas stream which leaks or sneaks around the treatment zone) to an absolute minimum through the proper design and use of internal baffling proven by model studies and research on full size precipitators.

F. Gas Flow—Model Studies

Proper gas flow patterns across the face of the precipitator can result in a 25–50 per cent reduction in over-all size. The use of transparent plastic three-dimensional model studies as well as field research has resulted in refinements in design never before possible.

Only at Research-Cottrell can you be assured of these latest of design techniques and improvements providing the most economical selection of equipment and efficiency of operation. Research-Cottrell personnel, backed by nearly a half century of gas cleaning experience, stand ready at any time to provide information or service.

For details or more information relative to the data contained herein, or any other general inquiries, please contact your nearest Research-Cottrell representative or write directly to:

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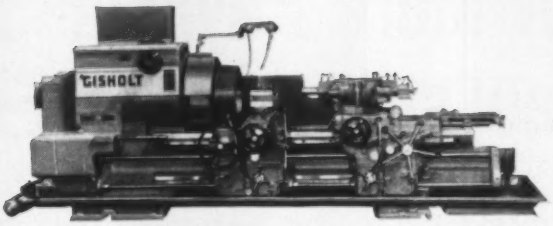

MASTERLINE® 3L Saddle Type Turret Lathe—This lathe offers maximum operator ease through an electric clutch and brake; speed selector for Direct, Pre-Set or Hi-Lo among 12 or 24 spindle speeds, with ample power available at every speed; separate lever controls for cross and longitudinal rapid traverse; and fully automatic lubrication. With a cross-feeding hex turret, low-cost standard tools handle all types of machining. JETracer® (for cross slide, cross-feeding hex turret, or mounted on turret face) and other attachments minimize operator skill—handle tapers, contours, steps and combination forms automatically.

How long could you stay in business if half your employees spent over three hours a day on coffee breaks? Your machine tools may be wasting that much time!

Farfetched? A new machine is at least 40% more efficient than its 10-year-old counterpart. You can replace ten old hand-operated lathes with only six current models.

Your savings would pyramid with reduced machining times, reject rates, floor space, maintenance costs, tooling, lubricants, power, and skilled labor requirements.

Act now! Call your Gisholt Representative. Find out how Gisholt MASTERLINE Machines can help you do it for less.

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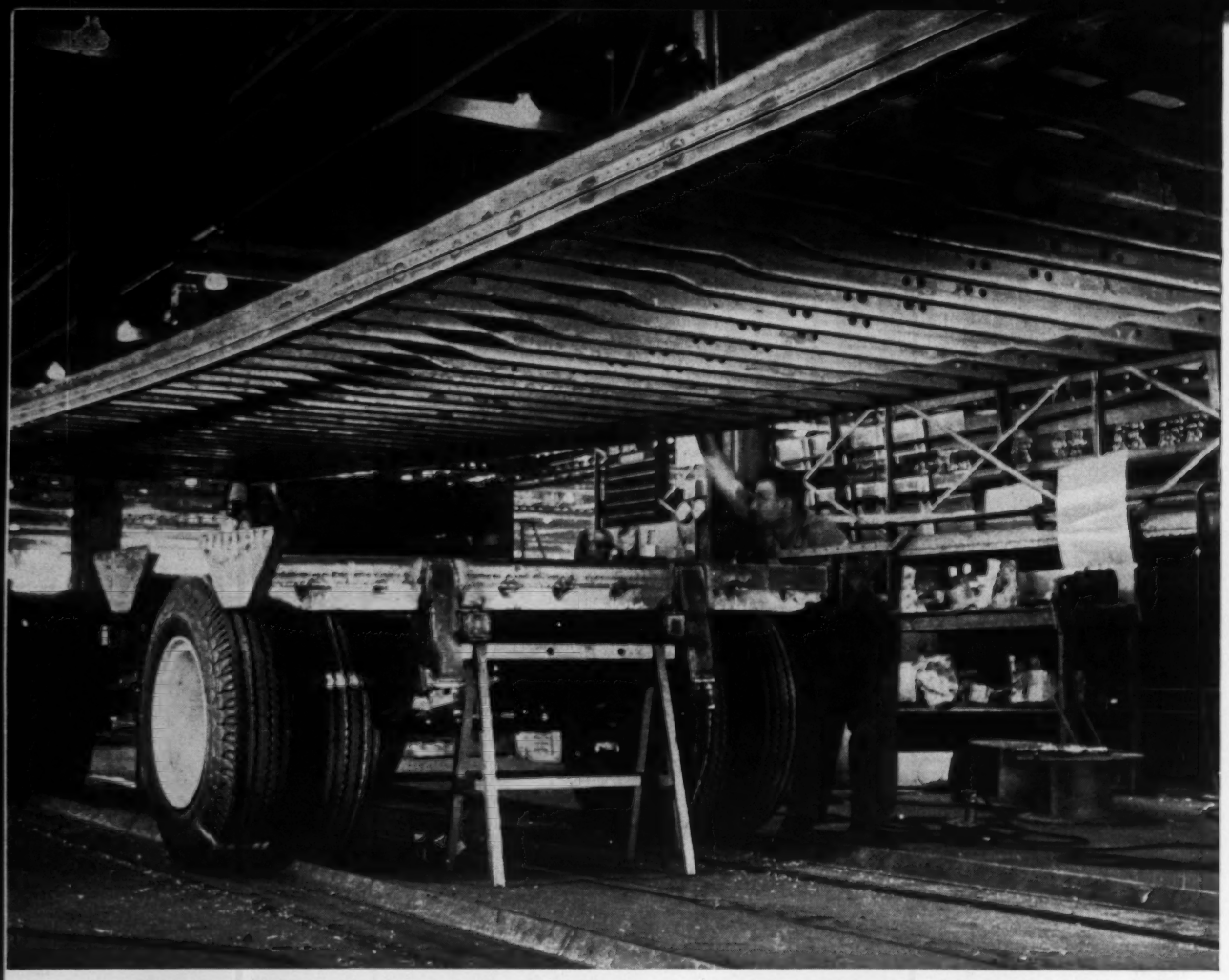


At Fruehauf Trailers' huge Avon Lake, Ohio, plant, crossmembers made from PITT-TEN high strength structural sheet provide 22 percent more payload. Here, on the assembly line, a Fruehauf trailer bed made with Pittsburgh Steel Co. PITT-TEN is swung onto the underconstruction assembly.

As Trailer Bed Crossmembers

Fruehauf Gets 22% More Payload With Pittsburgh Steel's New PITT-TEN

Twenty-two percent more payload—that's what Fruehauf is building into the framework of giant trailers assembled with crossmembers made of PITT-TEN, Pittsburgh Steel Company's new high strength structural sheet.

Fruehauf uses PITT-TEN #1 at its Avon Lake, Ohio, plant—the largest trailer manufacturing facility in the world—because it offers a combination of benefits that . . .

- **Cuts deadweight with no loss of strength**
- **Lengthens service life through superior corrosion resistance**

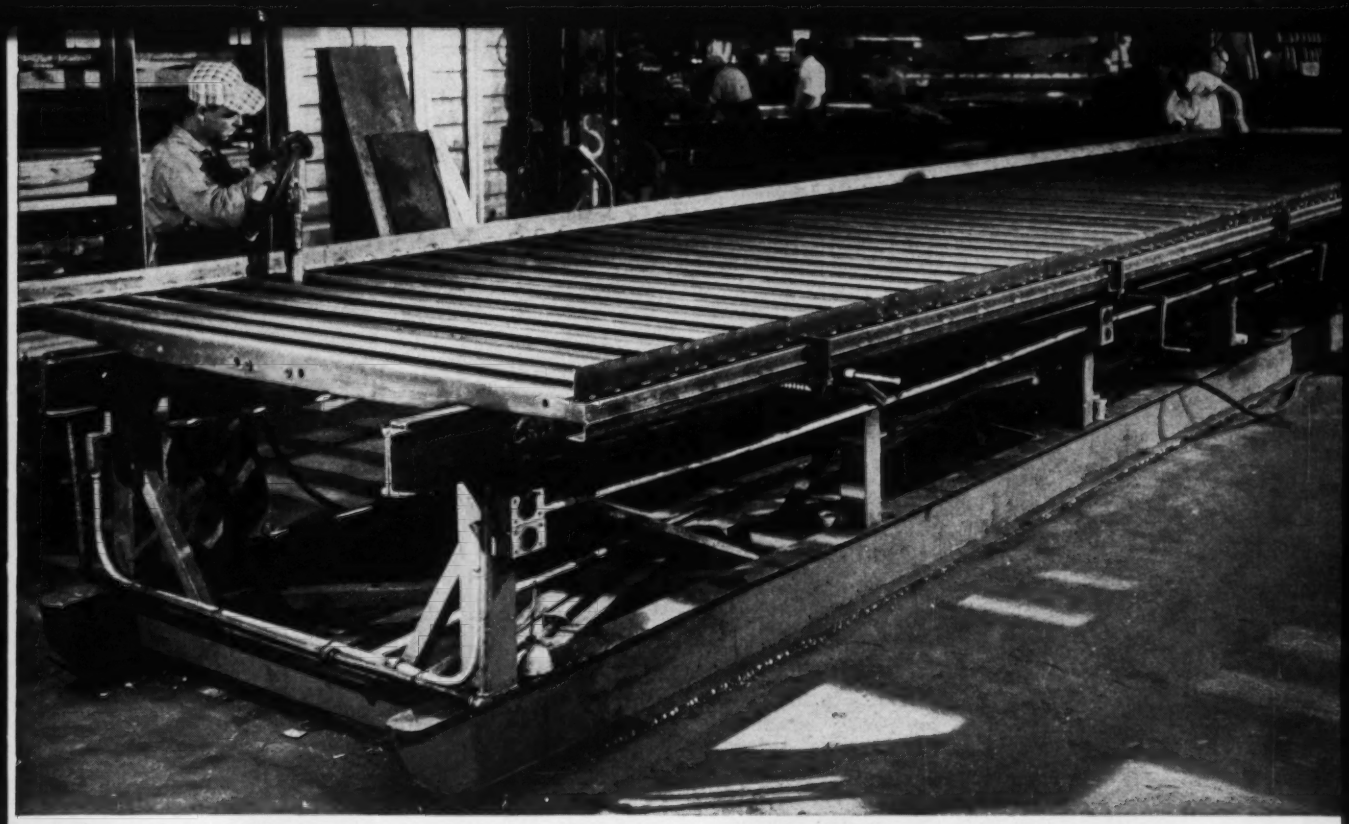
● **Light Yet Strong** — Fruehauf tries to make its trailers as light as possible with no sacrifice in strength. Trailer bed crossmembers made of high strength PITT-TEN are lighter, for equal strength, than mild steel.

The weight saving amounts to more than eight pounds for each piece. That's because three pounds of PITT-TEN do the work of nearly four pounds of ordinary sheet steel. At the same time, it provides all the strength needed for years of hard use.

Corrosion resistance is another problem in trailer operation. Fruehauf trailers are used under all types of conditions that could create maintenance headaches if the proper material were not used.

PITT-TEN #1 has four to six times the resistance of carbon steel to atmospheric corrosion. So, Fruehauf specifies PITT-TEN to reduce maintenance costs.

The trailer part basically is a channel 93⅛ inches long, 2 inches deep and 3 inches wide. Its width is expanded to 4½ inches on one side by an offset that extends most of its length. In addition, a ¾-inch



During assembly of Fruehauf trailer bed, cross-members made from high strength structural PITT-TEN are riveted to the side rail. PITT-TEN #1 reduces maintenance requirements of Fruehauf trailers through superior corrosion resistance. It has four to six times the corrosion resistance of carbon steel to atmospheric corrosion. PITT-TEN also cuts deadweight with no loss in strength.

return flange is applied full length to both edges.

Fruehauf engineers point out that forming this piece with offset and flange in high tensile steel would be a tricky business without consistent quality — and with PITT-TEN Fruehauf has a steel that does the job.

PITTSBURGH STEEL NEW SOURCE – This is one of several applications which mark the entry of Pittsburgh Steel in the high strength steel market, one of the fastest growing in metalworking.

That means this:

Fabricators of high strength steel structurals—or any product where the weight/strength ratio is a factor—now have a new source of supply.

In the eight years Pittsburgh Steel has been producing flat-rolled products, it has become recognized for the unexcelled quality of its steel sheet and strip. Now PITT-TEN is being produced by the same fine steelmaking and steel rolling facilities which have earned that reputation for quality.

PITT-TEN is produced in three grades, each with specific physical properties. Briefly, here they are:

PITT-TEN #1—An all-around high strength structural sheet that offers a combination of benefits. First is greater strength without increased weight; or equal strength with a lighter section. Second is longer product life, less maintenance through greater resistance to corrosion (four to six times that of mild carbon steel.)

PITT-TEN #2—high strength sheet with exceptional formability. This grade is produced to tensile and yield requirements to meet forming problems of specific fabricated parts.

PITT-TEN "X"—produced to guaranteed minimum yield points of 45,000 and 50,000 psi. This grade is especially useful where the controlling factor is a reduction in weight without loss of strength.

If your product's success depends on weight/strength factors, then Pittsburgh Steel's new PITT-TEN can benefit you, too.

Let one of our service metallurgists show you how. They're as familiar with steel fabricating problems as they are with steelmaking problems. Just contact one of the sales offices listed here.

Pittsburgh Steel Company

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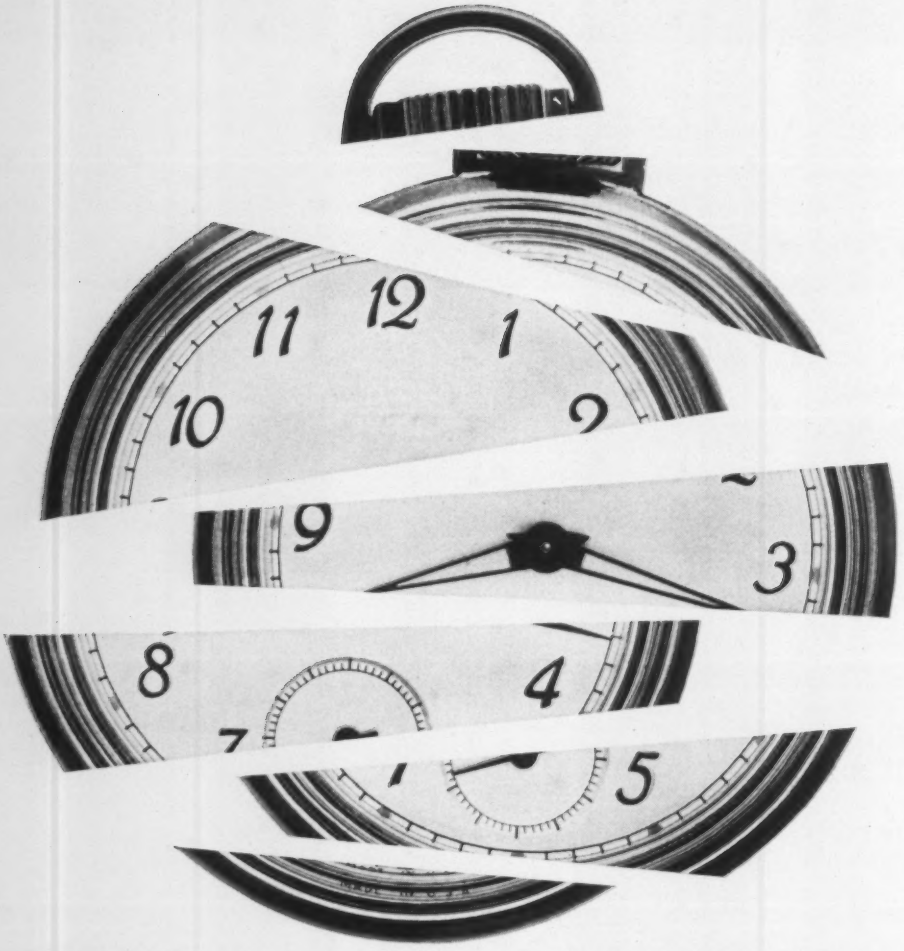


For General Time Corporation

PRODUCTION ANSWERS FALL INTO PLACE, SAVE $56 per 1,000 UNITS WITH SCOTCH-WELD®

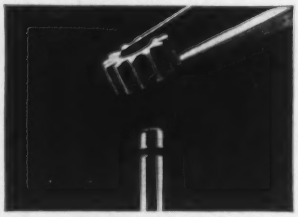
BRAND STRUCTURAL ADHESIVES

Before a SCOTCH-WELD Brand Structural Adhesive joined the assembly line, attaching tiny gear heads to mounting pins was a tedious and costly operation for Haydon Division, General Time Corporation, Torrington, Conn. High-temperature brazing frequently distorted gear configuration, warped shafts, upset metal hardness. A 100% inspection, with rejects aplenty, was required to assure watch-like accuracy in the final product—synchronous timing motors.

A 3M Field Engineer suggested SCOTCH-WELD EC-1386. In production, bonding gears to shafts with this epoxy-type adhesive eliminated the distortion-causing heat problem, ended high rejects, made 100% inspection unnecessary. The void-filling properties of EC-1386 reduced tolerances required between shaft and gear. And best of all, savings of $56.37 per thousand assemblies resulted!

Chances are your company can save money, speed production, simplify putting new designs into production by taking advantage of SCOTCH-WELD Structural Adhesives or other adhesive products developed by dynamic 3M research. Ask the nearby 3M Field Engineer to show you how! Or write AC&S Division, 3M Co., Dept. SBQ-31, St. Paul 6, Minn.

"SCOTCH-WELD" is a reg. TM of 3M Co.



SCOTCH-WELD EC-1386 simplifies bonding gear to shaft by eliminating high brazing heat that distorted the tiny parts, changed metal hardness.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

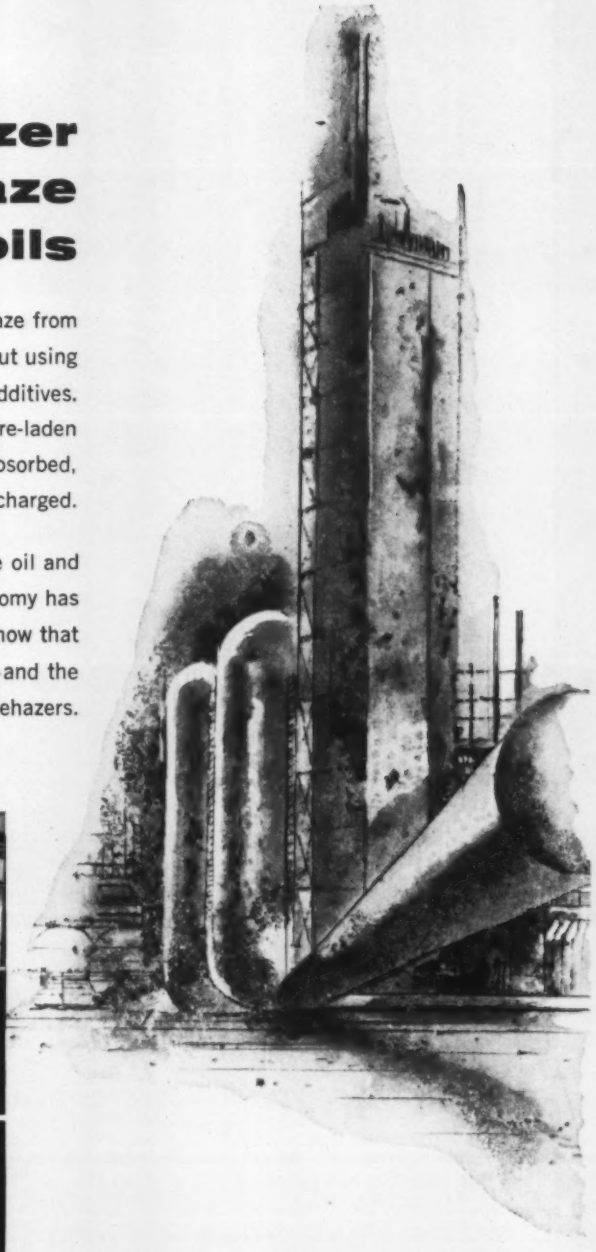
...WHERE RESEARCH IS THE KEY TO TOMORROW

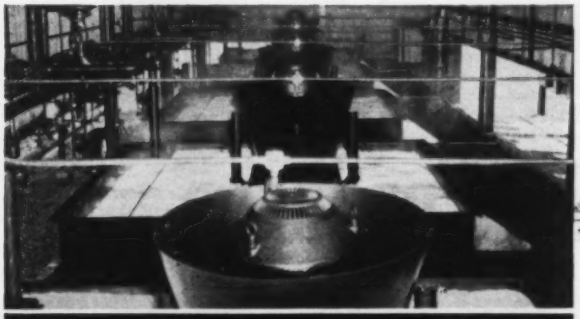
3M COMPANY

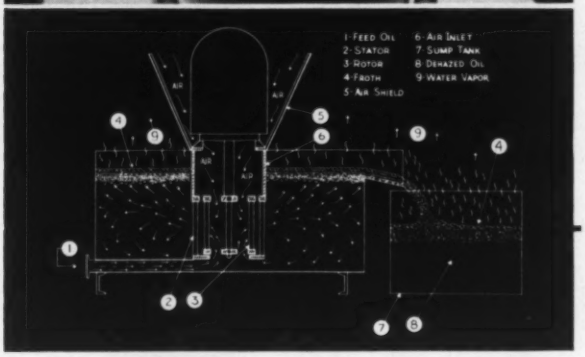
Hendrick dehazer lifts the haze from refinery oils

The Hendrick Hydro-Dehazer removes haze from refinery oils quickly and economically, without using compressed air, high heat, chemicals or other additives. The Hydro-Dehazer's huge rotor mixes moisture-laden oil with free air until the moisture is absorbed, rises to the top, and is discharged.

Produces bright, haze-free furnace oil and diesel fuel at 400 B.P.H. Economy has been proven in installations which show that Hendrick has the most efficient method—and the lowest operating cost—of all dehazers.







Hendrick will be glad to arrange a free demonstration. For details, mail this coupon today.

HENDRICK MANUFACTURING COMPANY
37 Dundaff Street, Carbondale, Pennsylvania

Gentlemen: I am interested in learning more about the new Hendrick Hydro-Dehazer.

☐ Please arrange demonstration of the Dehazer Pilot Model.

☐ Please send technical data.

NAME_____ TITLE_____

COMPANY_____

STREET ADDRESS_____

CITY_____ STATE_____

Hendrick

Manufacturing Company

Carbondale, Pennsylvania

PERFORATED METAL · PERFORATED METAL SCREENS · WEDGE-SLOT AND HENDRICK WEDGE WIRE SCREENS · ARCHITECTURAL GRILLES MITCO OPEN STEEL FLOORING · SHUR-SITE TREADS · ARMORGRIDS HENDRICK HYDRO DEHAZER · DISTILLATION COLUMN INTERNALS FLUIDIZED BED PERFORATED PLATES AND GRIDS

REMARKABLE NEW PROCESS

...opens way for you to solve critical high-temperature design problems

At 5500°F. cobalt runs like water. Nickel boils. Zinc vaporizes. But tungsten remains solid.

To make this property pay off for you, Sylvania recently put to work its new isostatic pressing and sintering operation. Through this operation, it can produce tungsten or molybdenum ingots up to 10" in diameter and up to 4 feet long. *Sylvania now produces all four* — billets and ingots for forging, electrodes for arc casting, blanks for machining, or machined blanks ready for your use.

Perhaps you've never considered refractory metals as the answer to your needs. But the same properties that solve the problems of throat inserts for rockets and missiles can pay you dividends in piercing points, boring bars, dies, tools and in countless other ways.

Want more facts? Or experienced technical help in proving out your special ideas? Just write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pennsylvania.

SYLVANIA

Subsidiary of **GENERAL TELEPHONE & ELECTRONICS**

TO A CAT'S WHISKER: Palmoshield roll oil is tailored to your mill under such exact laboratory control that fatty acid content will not vary ½%. It is helping many mills to get optimum production, in tonnage and in quality and uniformity of sheet.

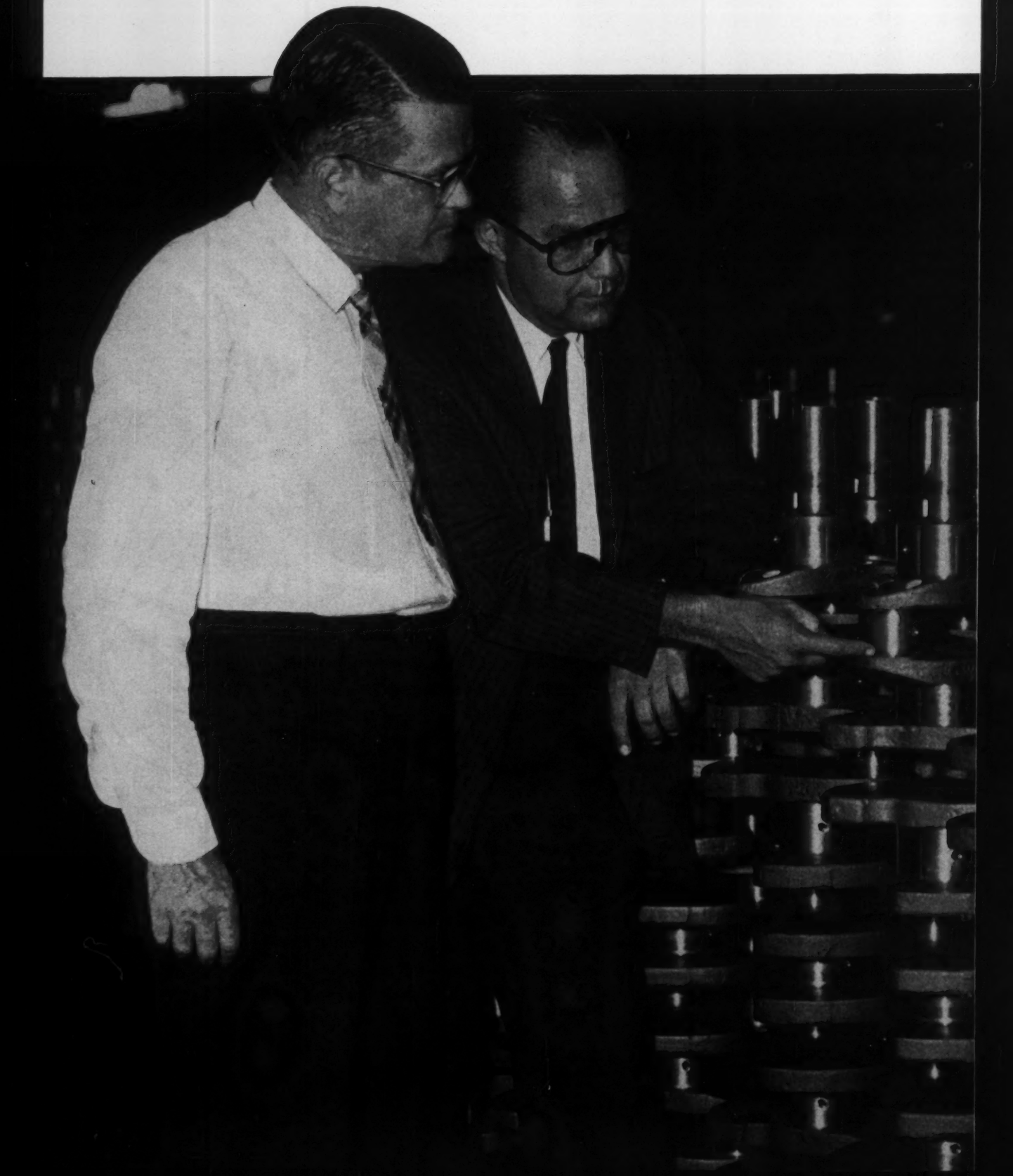
Ironsides

SHIELD PRODUCTS

THE IRONSIDES COMPANY, COLUMBUS 16, OHIO • IRONSIDES OF CANADA, LTD., OAKVILLE, ONTARIO

All-domestic American and Canadian roll oils

How Norm Nesbitt and Allen Moore



teamed up to cut dressing costs 50% at ATLAS CRANKSHAFT

This is a good example of the way it sometimes pays to break a habit even when it's a pretty *good* habit.

At Atlas Crankshaft Corp., in Fostoria, Ohio, the dressing wheels that are used to keep big crankshaft grinding wheels at peak performance play a very important part in maintaining production at a high and constant volume. There was nothing really wrong with the 6″ dressing wheels Atlas had been using for years. They did a pretty good job and usually lasted through an 8-hour day.

But Atlas' Purchasing Agent Norm Nesbitt wasn't content with "good enough". He wanted "better" and had his eye firmly fixed on no less than "best". He got hold of Bay State representative Allen Moore and told him to go to work on the problem.

Moore is thoroughly accustomed to the kind of abrasive problems that require long and painstaking analysis. But this time, he found that it was a case of the solution being so simple that nobody had thought of it.

He simply recommended a larger dressing wheel . . . an 8-inch wheel instead of the 6-incher that was being used. Both wheels were stubbed at 4″ but buying the larger wheel reduced the cost per cubic inch of usable abrasive 50% and cut the number of dressing-wheel changes from one a day to one every two days.

Not all abrasive problems are as easily solved as this one, of course. But the point of this case is both simple and important: The most obvious improvements in grinding operations are often the most difficult to spot. Your Bay State distributor and our direct representatives are thoroughly *trained* to spot the obvious and to *dig* for what is not obvious. You can't lose and you may well gain substantially by just turning them loose to analyze your grinding operations. *Better grinding at lower cost . . . that is their business.*

Atlas operator Paul Huff sets new 8″ dressing wheel against surface of big, crankshaft grinding wheel. 8″ diameter dressing wheel lasts twice as long as 6″ wheel because both are stubbed at 4″ and 8″ wheel costs half as much per cubic inch of usable abrasive.

Norman Nesbitt, left, as purchasing executive for Atlas Crankshaft Corp. for 15 years, has encountered, and successfully met, every purchasing problem "in the book" . . . and then some!

Allen Moore, abrasive specialist, with many years experience with distributors and grinding wheel manufacturers, has a broad knowledge of abrasive wheel applications. His Business Administration degree attests to his awareness of cost-savings importance.

BAY STATE ABRASIVES

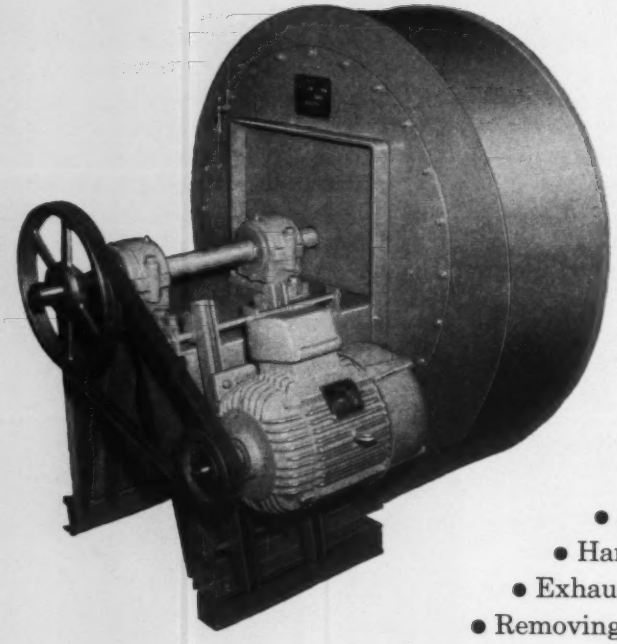
BAY STATE WHEELS of PROGRESS

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Chicago, Cleveland, Detroit, Los Angeles, Pittsburgh. *Distributors:* All principal cities.

HOW TO HANDLE SOME OF THE MOST

PUNISHING AIR JOBS

IN THE MILL



- Moving hot gases.
- Handling materials in conveyor systems.
- Exhausting corrosive fumes.
- Removing dust-laden air.

'BUFFALO' INDUSTRIAL EXHAUSTERS

Wherever you find a punishing air job, you're very apt to find a hard-working 'Buffalo' Industrial Exhauster at work. Available with highly efficient air wheel (type AW), front-flanged material wheel (type MW), or open material wheel (type OW) without front flange.

Hot gases, from 200° to 850° F., are being removed successfully by special 'Buffalo' Industrial Exhausters with shaft heat slingers.

Where corrosive fumes would quickly put an ordinary fan out of service, rubber-lined 'Buffalo' Exhausters are handling them with major savings in fan replacement costs.

Next time you have a tough air moving job, call in your resident 'Buffalo' Engineering Representative. He has the experience to recommend the right fan for the job.

"Buffalo"

AIR HANDLING DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

J & L Steel Service Centers—efficient and dependable. Production slitting is custom slitting at the Department Stores of Steel. Sharp slitter knives minimize burrs. Continual gauge checks assure uniformity. Coils are packaged and shipped to arrive damage-free, ready for immediate use. *Every* order at J & L gets this kind of *extra* care—thanks to modern machinery, advanced methods and skilled warehousemen. That's why it pays to call J & L for *all* your needs —carbon steel, specialty steels or stainless.

Take advantage of the streamlined, time-saver service J & L offers. Count on the Department Stores of Steel. You'll get exactly what you want—when you want it.

J & L Steel Warehouse Division

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NASHVILLE • NEW ORLEANS • NEW YORK • PITTSBURGH

You win savings in the long run! *With Vancoram Chromium Alloys.*

True economy is your prize in the long run when you choose from the comprehensive range of Vancoram Chromium Alloys—because there's one 'just right' for every job you do. And buying 'nearly right' just isn't right enough!

Vancoram Chromium Alloys meet specific needs for makers of stainless, heat-resisting, tool and constructional alloy steels, and for the foundry industry. Choose from high-, medium- and low-carbon grades, including EXLO,® a true ferroalloy with high chromium-to-carbon ratio. Vancoram Ferrochromiums and Ferrochrome-Silicons have a well-earned reputation for cleanliness and uniformity. Your VCA representative can help you select the composition 'just right' for you. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N.Y. • Chicago • Cleveland • Detroit • Pittsburgh

Be sure to visit us at the Hotel Warwick during the A.I.M.E. Open Hearth Meeting, Philadelphia, April 10 to 12.

VANADIUM
CORPORATION OF AMERICA
Producers of alloys, metals and chemicals

VANCORAM

BLAW-KNOX

Hot Strip Mills

Blaw-Knox designs and builds a full range of continuous, semi-continuous and single stand reversing hot strip mills. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings. Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Building, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

56-inch semi-continuous hot strip mill.

BETTER PROFITS THROUGH BETTER TOOLING WITH CARBOLOY® CARBIDE PLUSES

ANNOUNCING THE NEW CARBOLOY® TRACER IN THE ADJUST-O-BREAKER TOOLHOLDER FAMILY

Now you can choose your tracer toolholders with all the cost-cutting advantages of the Carboloy® Adjust-O-Breaker line. The newest addition to the Adjust-O-Breaker line, this tracer toolholder is available in 2 styles and 7 sizes to help you handle more jobs with less tooling.

The exclusive Adjust-O-Breaker design lets you adjust the chipbreaker from any angle . . . offers any desired adjustment within its range . . . features "floating" indexable chipbreaker with absolute repeatability. In addition to the tracers, you can choose from negative rake Adjust-O-Breakers (10 styles, 54 sizes), and positive rake (5 styles, 50 sizes), to meet most of your tooling needs more efficiently and economically.

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CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

HERE!

ADD UP TO 4% TO YOUR NET PROFIT

Caught in a profit squeeze? The contents of the Texaco man's briefcase can help you do something about it. Inside is Texaco's "Stop Loss" Program. It's a new cost control tool that can knock as much as 15% off your maintenance costs by showing you how to organize your lubrication. You can tack this saving directly onto profit—for an average 4% net gain. It will pay you to get the details. Write for our folder "How to Starve a Scrap Pile." **TEXACO** INC., 135 East 42nd Street, New York 17, N. Y. Dept. IA-181

TEXACO

Why metals corrode...and how you can prevent it

The basic cause of corrosion is the instability of metals in their refined state. Metals tend to revert to their natural states through the processes of corrosion. For example, when you analyze rust, you will find it is iron oxide. When you analyze natural iron ore, you find it, too, is iron oxide. Six forms of corrosion which can attack the equipment you design are:

1. General tarnishing or rusting with occasional perforations in highly affected areas.

2. Highly localized attack by pitting.

3. Cracking induced by a combination of stress and corrosion.

4. Corrosion confined to crevices, under gaskets, or washers, or in sockets.

5. Corrosion of one of an alloy's constituents leaving a weak residue.

6. Corrosion near the junction of two different metals.

In all of the six forms of corrosion mentioned above, corrosion has the same basic mechanism. It's similar to the electrochemical action in a dry cell.

The electrolyte in the dry cell corresponds to the corrosive media, which may be anything from the moisture in the air to the strongest alkali or acid.

The plates of the battery correspond to the metal involved in corrosion.

A potential difference between these metals or different areas on the same metal causes electricity to flow between them through the electrolyte and a metallic bridge or contact that completes the circuit.

At the anode, a destructive alteration or eating away of metal occurs when the positively charged atoms of metal detach from the solid surface and enter the solution as ions.

The corresponding negative charges, in the form of electrons, travel through the metal, through the metallic bridge, to the cathode.

Briefly then, for corrosion to occur, there must first be a difference in potential between the metals or areas on the same piece of metal so that electricity will flow between them. Next, a release of electrons at the anode and a formation of metal ions through disintegration of metal at the anode. At the cathode, there must be a simultaneous acceptance of electrons. Action at the anode cannot go on alone, nor can action at the cathode.

CONTROLLING CORROSION

When corrosion occurs because of the differences in electrical potential of dissimilar metals, it is known as galvanic action. Differences in potential from point to point on a single metal surface causes corrosion known as local action.

When you plan against galvanic corrosion it is essential to know which metal in the couple will suffer accelerated corrosion . . . will act as the anode in the corrosion reaction.

The galvanic series table shown below can supply this information. In any couple, the metal near the top of this series will be the anode and suffer accelerated corrosion in a galvanic couple. The one nearer the bottom will be the cathode and remain free from attack or may corrode at a much slower rate.

GALVANIC SERIES TABLE

Magnesium
Magnesium alloys
•
Zinc
•
Aluminum 25
•
Cadmium
•
Aluminum 17ST
•
Steel or Iron, Cast Iron
•
Chromium-iron (active)
•
Ni-Resist
•
18-8 Stainless (active)
18-8-3 Stainless (active)
•
Lead-tin solders
Lead, Tin
•
Nickel (active)
Inconel* (active)
•
Brasses, Copper, Bronzes
Copper-nickel alloys, Monel
•
Silver solder
•
Nickel (passive)
Inconel (passive)
•
Chromium-iron (passive)
18-8 Stainless (passive)
18-8-3 Stainless (passive)
•
Silver
•
Graphite, Gold, Platinum

HOW TO USE THE CHART

Notice how the metals are grouped in the galvanic series table. Any metal in one group can be safely used with any other metal in the same group. However, when you start mixing metals from different groups, you may run into serious galvanic corrosion of the metal higher on the list. And the further apart these metals are listed, the worse this corrosion may be.

But, if you have to mix metals, pay particular attention to the electrical contact between them. Eliminate any metallic bridges or contacts of metal to metal that will permit the flow of electrons through them. You can do this by separating the metals physically, or by using insulation or protective coatings. Another factor is the relative areas of the metals in contact with each other. Parts having the smaller area should be of a metal with a lower listing on the galvanic series table than the metal used for the larger area.

When you plan against local action, remember that the corrosion process is galvanic: Electrons move from one point in the metal to another. One of the easiest ways to prevent local action is to use a metal with little or no impurity. When alloys are involved, make sure the constituents are closely listed in the galvanic series table. Local action may also be stopped by the use of protective coatings, which shield the metal from the corrosive media. Environment must also be considered, for its nature may be an important factor in either promoting or restricting corrosion.

TECHNICAL ASSISTANCE

As you can see, many factors are involved in both local and galvanic action. That's why it's best to bring your metal problem to Inco's Corrosion Engineering Service. Available data will be furnished wherever possible . . . tests will be made where needed. Inco's Corrosion Engineering Service will be glad to apply principles of corrosion control to your specific problem.

LITERATURE

The publications listed below will provide more detailed information on how you can combat corrosion by using nickel-containing metals.

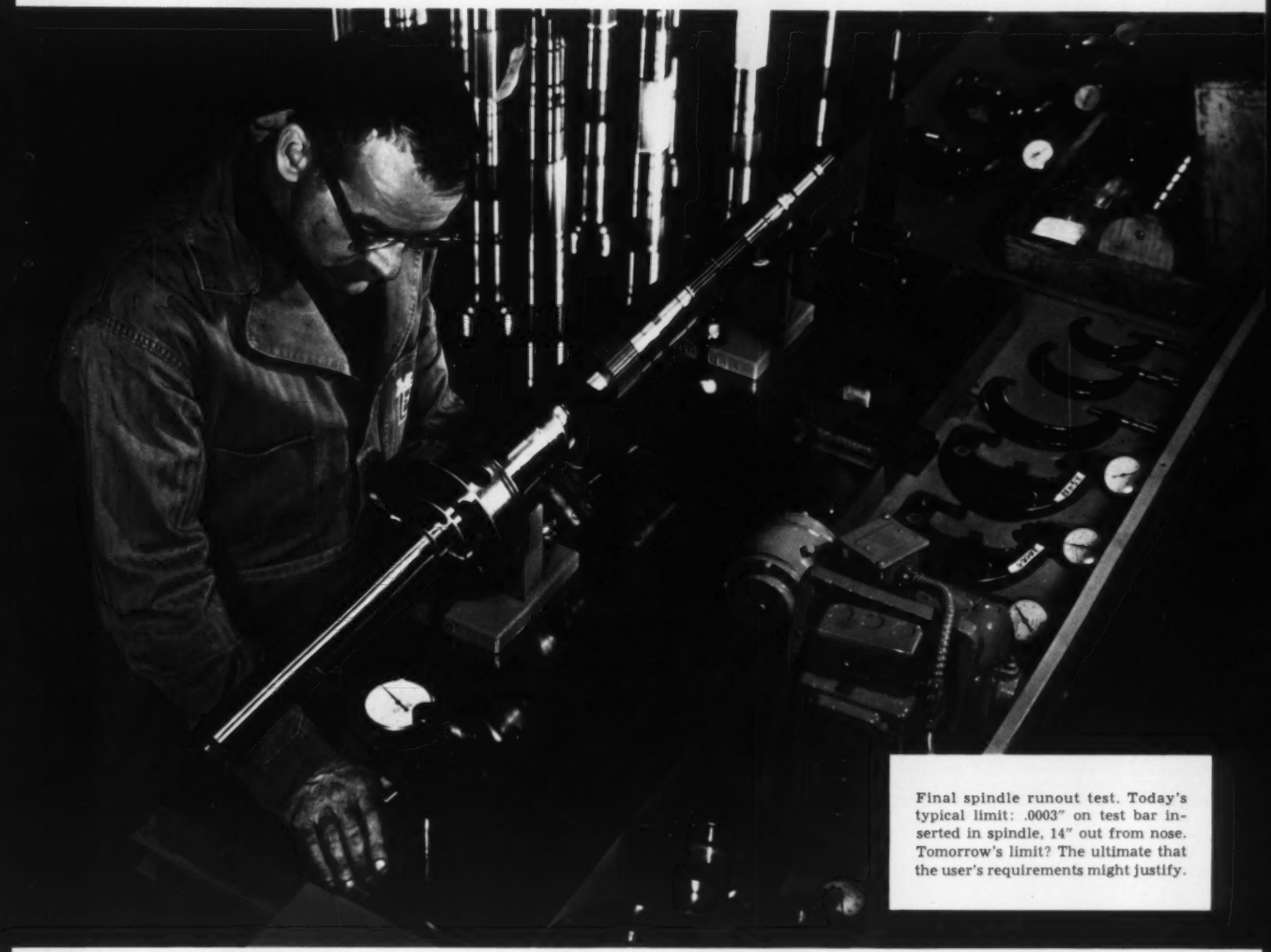
Publication Number	Name
A232	Corrosion Problems in Nuclear Reactor Power Stations
A59	Factors of Importance in the Atmospheric Corrosion Testing of Low-Alloy Steels
A62	A Theory of the Mechanism of Rusting of Low-Alloy Steel in the Atmosphere
A137	Corrosion by Some Organic Acids and Related Compounds
A144	Some Observations of the Potentials of Stainless Steels in Flowing Sea Water

A complete list of the 187 Inco publications and technical bulletins on nickel-containing metals can be obtained by writing for "List A", to:

*Registered trademark

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N.Y.

He's making a Monarch Lathe...



Final spindle runout test. Today's typical limit: .0003" on test bar inserted in spindle, 14" out from nose. Tomorrow's limit? The ultimate that the user's requirements might justify.

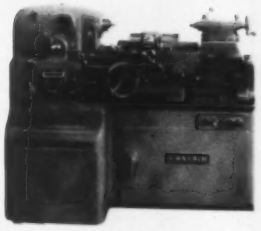
One example of where the extra values come from—in your MONARCH Lathes

Over and over, as a Monarch Lathe evolves, this scene repeats itself with constant variations. Although we ignore no areas in enforcing accuracy standards, we are almost obsessed in our attention to the most sensitive of all—the headstock spindle. True lathe accuracy is out of the question without utmost accuracy here.

In the picture above you see one of the 27 final Spindle-spection tests. And don't forget that this, and every Monarch spindle, has already been checked and rechecked at every step of its production.

Such accuracy is not only a fetish with us, but a special benefit to you. It delivers such finish as to cut considerably—or eliminate—other operations. It lengthens tool life. It contributes to increased production at greater speeds and feeds.

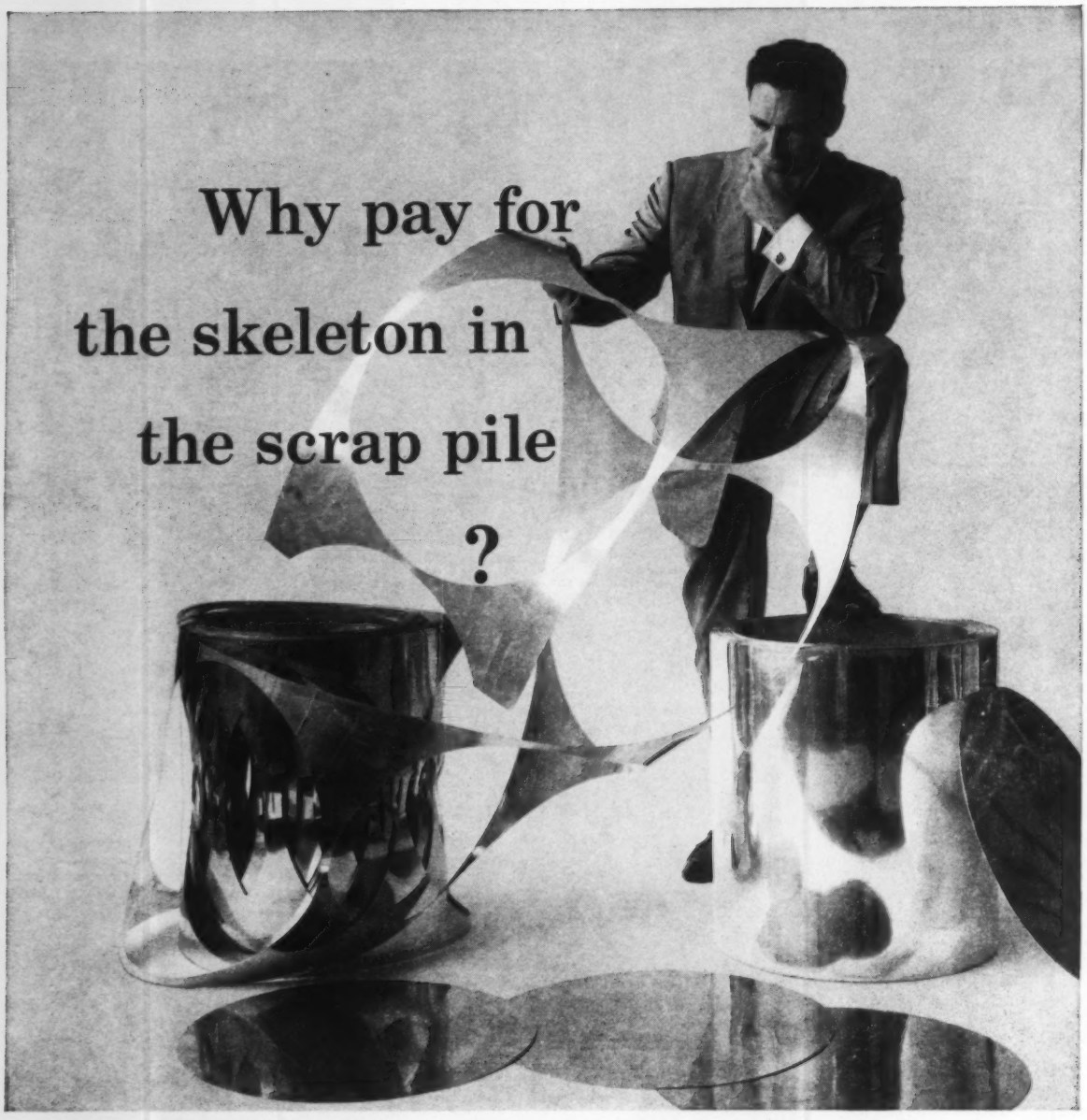
When you invest what it takes for a good lathe today, isn't anything less than the greatest value a false economy? We can prove it on your part, using our machines, in our Turning Clinic here in Sidney. Just write—THE MONARCH MACHINE TOOL COMPANY, SIDNEY, OHIO.



WHEN YOU BUY VALUE
MONARCHS COST LESS

Monarch
TURNING MACHINES

VISIT MONARCH—*We'll turn your part to return you profit*



WHEN you stamp your own aluminum circles or any irregular blanks, up to 25% of coil weight ends up as scrap.

You can eliminate this waste—plus labor of shearing and blanking—by buying circles or blanks direct from Fairmont.

Fairmont is *the* source for circles. As a prime supplier of aluminum blanks to *every* utensil maker, Fairmont's 30-year stockpile of dies is unduplicated anywhere. Find out how easily we can fill your requirements from our stock of dies.

Or by blanking from your dies in our plant, we can effect labor, material savings for you.

Other Fairmont benefits: the consistent quality that is a Fairmont tradition . . . individual flash annealing for finer grain structure . . . 100% inspection of every blank.

FIND OUT ABOUT FAIRMONT'S CUSTOM BLANKING SERVICE NOW

A Fairmont engineer will be glad to give you details. Call your local Fairmont office. Or write Vice President, Sales, Dept. 33-C, Fairmont Aluminum Co., Fairmont, West Virginia.

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THE STAGGERING COST OF SERVICE shows up in inventory statements of steel mills. Last year, finished inventories were increased by more than $40 million by U. S. Steel Corp. And Jones & Laughlin Steel Corp. added more than $200 million to finished and semi-finished stocks. Finished goods inventories were more than doubled by Allegheny Ludlum Steel Corp.

REMOVAL OF THE FEDERAL EXCISE TAX ON CARS is asked by L. A. Iacocca, Ford Motor Co. Ford division general manager. He claims this would stimulate car sales and the national economy. Says Mr. Iacocca: "Since these taxes are imposed on wholesale prices, they are largely hidden taxes. But they add about $200 to the price of the average car."

ONE OF THE BIGGEST SMALL BUSINESS SYMPOSIUMS in the history of U. S. Air Force procurement will be held next month by the General Electric Corp. The company will invite 1000 midwestern small businesses to look over $300 million of GE subcontract requirements. Most of the business is in connection with jet engines. GE will ask for bids on the work.

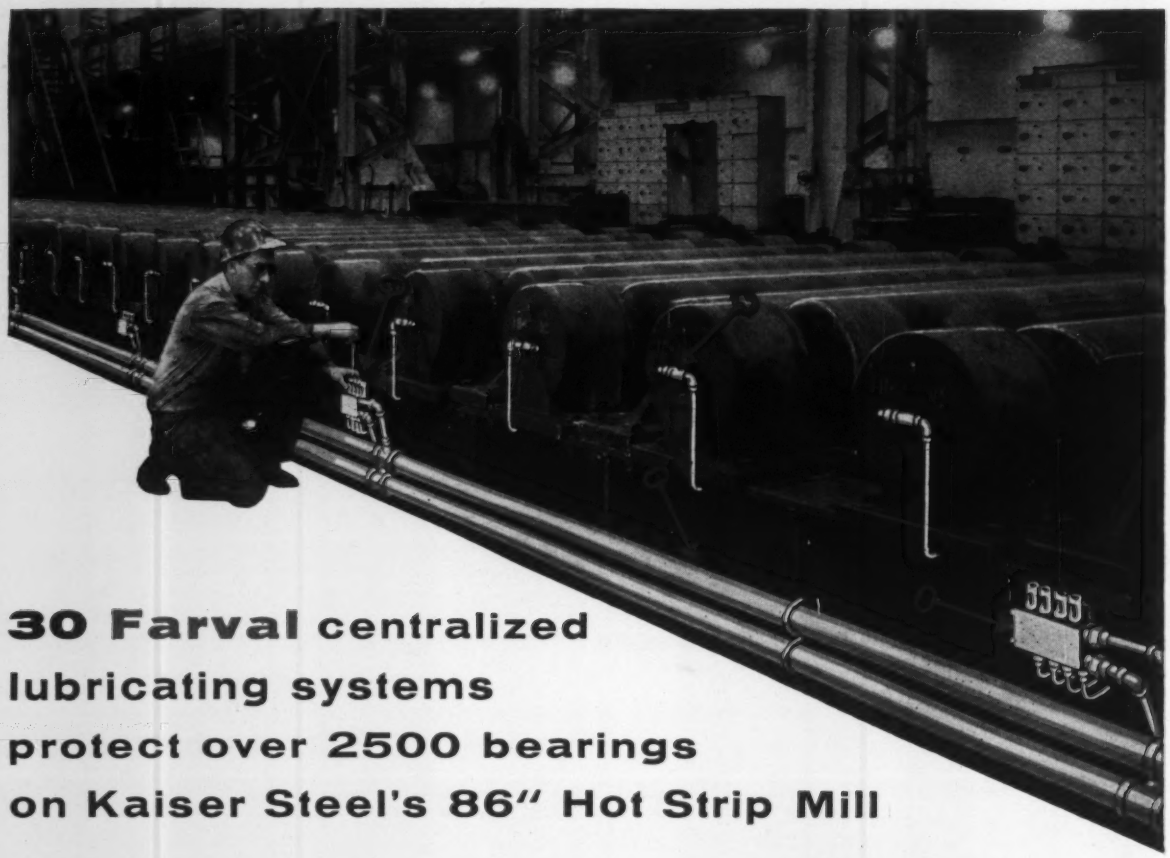
THE FLOOD OF NEW PRODUCTS coming on the market is putting new emphasis on merchandising. One expert estimates that $1 billion was spent last year on point-of-purchase sales aids.

CONSULTANTS IN THE ELECTRIC POWER FIELD are now urging that new plants be equipped with high voltage systems. Reason: To reduce installation costs and allow use of more efficient motors.

COPPER, LEAD AND ZINC producers will have to cut either production or prices, according to economist Eliot Janeway. He says a "much greater than seasonal surge will be needed, and in the next 30 days, to avoid further market deterioration."

ALUMINUM CONSUMPTION in 33 selected countries increased almost 70 pct in the seven-year period, 1953-59, according to the Commerce Dept. The record: 1953, 5.8 million lb; 1959, 9.8 million lb.

A NOVEL SALES PROMOTION idea has been set by Westinghouse Electric Corp. to boost sales during the April-June period. Buyers of Westinghouse major appliances will get three portable appliances free. The free portable appliances, to be shipped together to dealers in a single carton: Can opener, hot dog cooker, mixer.

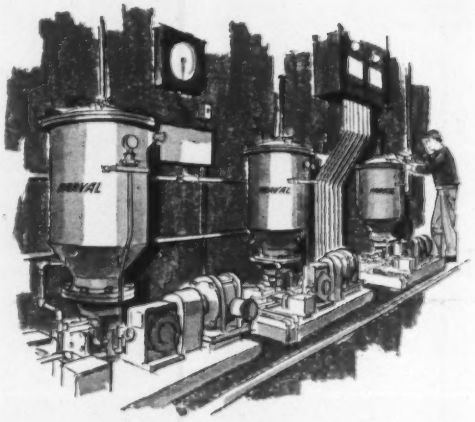


30 Farval centralized lubricating systems protect over 2500 bearings on Kaiser Steel's 86" Hot Strip Mill

Here on the mill table, between No. 4 and No. 5 roughing stands, Farval's positive, dependable lubrication is continuously on the job to prevent overheated, damaged bearings—costly mill shutdowns. A central bulk filling system is currently being designed and installed that will serve all the mill's Farval automatic stations.

On their 45 x 90-inch Universal Slabbing Mill, Kaiser engineers installed 15 Farval systems to serve over 1400 vital bearings. Also, 3 of Kaiser's 4 blast furnaces and over 100 different mill cranes get round-the-clock lubrication—thanks to modern engineered-for-the-job Farval systems.

Remember, for the ultimate in bearing protection—it's Farval. For the latest information on what Farval can do in your plant, write for free Bulletin 26-T.



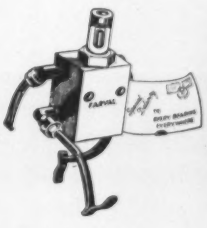
• Three of many automatic, time clock controlled, end-of-line Farval Central Stations that serve Kaiser Steel's rolling facilities.

Farval Studies in Centralized Lubrication No. 254

Farval Division
Eaton Manufacturing Company
3282 East 80th Street • Cleveland 4, Ohio

KEYS TO ADEQUATE LUBRICATION

Wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and central pumping station—you know industrial equipment is being properly lubricated.



Are Computers Taking Over Management's Functions?

Computers are being used to run steel mills, chemical plants and large oil refineries.

They are taking over more and more jobs every day. In the process, are they taking over traditional management functions?

By G. J. McManus

■ You might as well get used to it: The term, "Automanagement," is ready to be born.

The concept is here already. Automatic management is being applied to the rolling of steel, the distribution of electrical products, the operation of refineries and a raft of other areas.

Companies are going to electronic systems for two reasons:

1. They want faster management.
2. They want more scientific management.

Pushing Managers Out?—In a handful of cases, the new systems are fully automatic. Computers are locked into closed managements loops. The machines receive data, they make decisions of a management character; and decisions feed back into the system without human review or intervention.

Is all this pushing managers out of the picture?

There doesn't seem to be any evidence computers are eliminating managers or anyone else. For one thing, the workload is increasing in areas where electronic systems are most popular.

Needs and Opportunities—Also, the computers are opening up new needs and opportunities for management. Companies are finding there are a lot of "exceptions" in jobs that were supposed to be routine. Research men and sales managers are tackling problems that would have been completely beyond them before.

WESTINGHOUSE'S NEW: "It was less costly to be inefficient."

Computer management is most common in high speed plant processes. However, it is being used for a few general functions. Westinghouse Electric Corp. has linked a computer by teletype to 50 order entering offices. The machine receives a teletyped order, selects the best warehouse to fill it, and sends out a shipping order to that warehouse.

More frequently, management loops are left open at the final ac-

tion point. National Supply Div. of Armco Steel Corp. is applying a computer system to inventory control. The computer checks 90,000 items carried in oil country stores. It decides which of these should be replenished. Order recommendations are sent to store managers. The managers can accept or reject these.

Funnels and Tools — In the broader management circuits, computers are still serving mostly as data funnels and analytical tools. Gulf Oil Corp. is among the large companies that are pulling together information services in computer centers. There is little or no automatic feedback from Gulf's center at Houston.

The picture keeps changing as small loops close and reach out toward larger ones. At the same time, there is plenty of exaggeration, disillusionment and scepticism. It is not uncommon to find a company still trying to perfect a system that was reported to be working five years ago.

"There has been a tendency to confuse what has happened with what is going to happen in six months and what is going to happen in 10 years," says R. J. Baxter, electronics coordinater, comptroller department, Gulf Oil.

Feverish Activity—But there is certainly feverish activity. Among the models of International Business Machines, Inc., the 650 is the smallest unit practical for complex management problems. There are now some 3000 of the 650's in use.

IBM's new model 1401 has the power for complex work and costs less than the 650. About 4000 of the 1401's have been ordered. For the most involved and massive problems, computer makers are providing fantastic speeds. IBM's 7090 can add 225,000 numbers in a second. The company's newest model is at least 10 times faster.

The role of these and similar machines in management jobs is seldom identified positively. Faced with selling costly programs to an uneasy top echelon, one steel specialist winces at the words "automatic management."

"We don't even talk about optimizing until we've given them a lot of conditioning," he says.

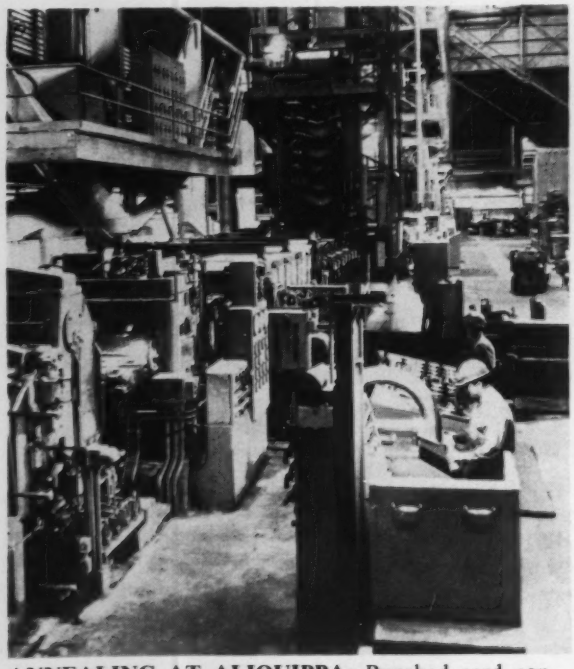
Blurred Lines—More important, management functions are usually blended with conventional controls and purely clerical systems. Dividing lines are blurred. However, computer men make it clear they are going beyond the old conventional systems.

"We're not spending millions just to eliminate the one or two control tower operators in a refinery," says Mr. Baxter of Gulf.

"We don't want to simply do a clerical job," says a computer specialist of National Supply.

In some situations, there is not enough time for managers to review decisions or even consider the problems involved. This is true of many oil and steel processes. There is too much variation for management to determine the best method in advance.

New Computer Systems—As a result of this combination, computer systems are going on plate mills of United States Steel Corp. at Gary,



ANNEALING AT ALIQUIPPA: Punched card containing production information is fed into computer (left) at the entry end of the annealing line at Jones & Laughlin Steel Corp.'s Aliquippa, Pa., Works. Computer types out production and accounting information (right) as coil concludes its cycle through the line.

Ind., and Republic Steel Corp. at Gadsden, Ala. Electronic units are due for hot-strip mills of National Steel Co. (Great Lakes), Crucible Steel Co. of America and one other.

Jones & Laughlin Steel Corp. is going to computers for basic oxygen vessels at Cleveland and a continuous annealing line at Aliquippa, Pa. J&L is also said to be talking computers for two electrolytic tinning lines.

Thinks for Itself—In finishing operations, the new systems will provide analysis and feedback for lines that run as fast as 2000 fpm. A reversing mill program of Westinghouse Electric Corp. starts with only input dimensions and composition of a slab. From these it computes a tentative schedule of passes.

After each pass, the machine checks its prediction of slab reduction against actual reduction.

In a continuous mill system of General Electric Co., the computer gets temperature and size information before steel hits the first stand. Power curves are interpolated to make initial mill settings. The computer makes no further decisions on the initial coil.

Brains Save Money—The mills hope their brain programs will give maximum efficiency and consistent quality. It is too soon to say what will be the actual gain.

However, the performance of computers in oil refineries gives some idea of the potential. Computer control of a distillation system at Gulf's Philadelphia refinery has increased efficiency from the old level of 85 pct to a current figure of 95 pct.

Through the Mirror — Systems men would like to put all management on a more current basis. "Conventional accounting is like using the rear view mirror to drive a car," says Mr. Baxter.

At the same time, the volume of information needed to run a business keeps increasing. Growth of credit cards has added 100 million papers a year to Gulf's data system. A single sales report of the company is now running 1.7 million lines.

GULF'S BAXTER: "There has been a tendency to confuse what has happened with what is going to happen in six months and . . . in 10 years."

Out of Hand—The East Pittsburgh plant of Westinghouse began about 10 years ago to apply scientific formulas to its purchasing. Things like lead time, future use and price were put into equations that told when and how much to buy. These equations eventually grew to the point where they became too complex for manual handling.

As a result, the whole operation was cranked into a computer. Now, there are no physical inventory records at East Pittsburgh.

The problem gets even bigger when you try and tie several systems together. Using conventional methods, you would have needed batteries of people just to handle the paper, says T. H. New, manager of the business systems department at Westinghouse, East Pittsburgh.

"It was less costly to be inefficient," he says.

Plant-Wide Control — But now, with electronic units, companies are pushing for this overall system. Steel mills are working feverishly to tie individual operations into scheduling systems for whole plants. Sales, distribution and other functions are being linked throughout industry.

As a first step, management is trying simply to get a moving picture of what is happening—as it happens, or sooner. This is being approached in several ways.

The systems men and the makers of business computers are working to set up mathematical pilot plants. These simulate actual operations. Most are very broad outlines; some are now coming close to the real thing.

Years in Minutes — Ultimately, these simulations may become so realistic they can be hooked into actual operations or at least used to make decisions on operations. While Westinghouse is training managers with its simulation, it is also using the comments of foremen to make the game more lifelike.

This kind of program gives management a broad, dynamic picture. The manager can make his decisions on the basis of overall good. Moreover, he can test decisions and alternatives in advance.

KENNEDY: ". . . Cannot be allowed to deteriorate."

RUSK: U. S. will meet its responsibilities.

Strong U.S. Stand Urged in Laos

In touring the Far East, Editor-in-Chief Tom Campbell stopped in Bangkok, Thailand, at the peak of tension in Laos.

These personal observations were cabled early this week.

■ The official position of the South East Asia Treaty Organization (SEATO) is this: The trouble in Laos is a civil war.

But unofficially, everyone agrees the Soviets are doing all they can to bring about a Red government in Laos.

Because of SEATO's charter, it cannot act unless there is communistic aggression-per se. That is, there must be physical aggression. Most diplomats agree this is not the case as yet. So far, the aid is by plane loads of arms and other help to local Laos Reds.

Line Drawn—It's established out here that President Kennedy has drawn the line. The reason: If the Reds are allowed to get away with anything in this area, it will mean they will get the idea they can do anything they want to.

Since 1954 there has been no physical aggression by the Reds in this area. But there has been subversion.

Matter of Time—It is only a matter of time before the whole Laos question must be faced realistically. But as far as top SEATO officials are concerned, they tell me that the situation is ticklish.

Their point: It is difficult to prove any physical aggression whatsoever. But they do agree that subversion will go on for years.

Their only answer is education.

Hate Chinese—(A side point I picked up in Bangkok and in Saigon: These people hate the guts of the Chinese Reds. That is why all the help comes directly from the Soviets; a matter of policy. The hate for the Chinese is so great among Laotians and Thailanders that the Red Chinese dare not take the chance of showing their help.)

Another side angle is the fact that the people of Laos have little idea of what is going on. The power struggle in Laos involved fewer than 200 top dogs who are trying to take over the government. That is why the official SEATO position is that there is a civil war going. Since SEATO cannot be involved in the internal affairs of any nation, the official position also is that little can be done there.

U. S. in Thailand—But I saw some U. S. planes and personnel, including Marines, coming into Thailand in response to President Kennedy's strong policy in telling the Reds what was what. It was also apparent at Saigon that our forces

were on more than a routine move. Apparently the Administration is ready to face reality if the Soviets continue to pour arms and help to the Laotian Reds.

The formula for helping the free people of South East Asia is simple, according to people I talked to in Bangkok. The No. 1 deal is a full stomach. The next is education.

Long Fight—"Of course, it will take time," said one SEATO official in a personal interview. "But it is a long hard fight to meet the Communists in this part of the world. The people must have some rock-bottom education and a real picture of what SEATO is trying to do if we are to make any progress."

Strong Stand—The major point is that the free nations have to take a stand. If the Red Chinese or the Soviets get away with anything in this part of the world, they will take it as a license to gobble up more territory.

That is why the U. S. is taking such a strong stand in the current matter.

SEATO is doing a big job out here. It is not spectacular, but it is down-to-earth and practical. Local people are being taught practical things such as maintenance of their way of life. Trades are being taught. Students are exchanged.

But once and for all—it is clear here that a fellow who knows how to splice a broken connection in an electric circuit is more important that a fellow who can spout top-level culture.

Their Viewpoint—As a final shot, I was told this: Look at things out here as they see them here, not as you in the U. S. see them. But it is clear that a bellyfull of rice, a stepup in education and some nationalism (directed in the right channels) will do a lot to hold back Communism.

But the other part is important here too, as shown in the past few days; there must be a strong stand taken by the U. S., no matter what the other SEATO nations decide to do.—**Tom Campbell.**

Joint Antitrust Move Underway

President Kennedy, the Dept. of Justice, the FTC join in coordinated attack on antitrust front.

One key point: Cooperation between Justice Dept. and FTC on enforcement of decrees.

By R. W. Crosby

▪ An antitrust steamroller is beginning to roll out of Washington. It will steam its way through industry throughout the country.

The steamroller is a coordinated antitrust effort by the White House, the Dept. of Justice, the Federal Trade Commission, and congressional investigators.

Old Cases Revived—The latest evidence of coordination is a Justice Dept. and FTC pact to find out if defendants in 56 past antitrust cases are living up to the judgments against them.

Attorney General Robert Kennedy and FTC Chairman Paul Rand Dixon have agreed the FTC should check these cases involving price-fixing, illegal allocation of markets, and mergers.

Cooperative Move — In seeking the FTC action, the Attorney General wrote Mr. Dixon: "It is hoped that the utilization of this procedure may inaugurate a new era of cooperation between the Dept. of Justice and the Federal Trade Commission and of more effective enforcement of antitrust decrees."

Mr. Dixon, who took office only last week, welcomed the "new era of cooperation." He said: "I agree with the Attorney General that a more effective enforcement program of antitrust decrees must be achieved."

To Be Decided—Neither the FTC nor the Justice Dept. would disclose what antitrust orders would be reviewed. But Robert Kennedy described them as "major ones in the antitrust area since 1940."

This action topped off a week of snowballing antitrust moves. It began with President John Kennedy joining his brother, the Attorney General, in the fight against industry price fixing and bid-rigging.

Presidential Action—The President, by executive action, is ordering all "collusive and identical bids" submitted to Federal agencies be turned over to the Justice Dept. and made public.

Making public alleged collusive bids is expected to be a deterrent to future identical bidding.

The Aim—Robert Kennedy, continually promising "vigorous antitrust enforcement," indicates that price fixing now is being investigated on a regional basis. He says:

"There are many areas of the United States—I would think almost every major metropolitan area —where we now have allegations of price fixing under investigation."

The Follow-Up—This broad approach will also be followed by the Federal Trade Commission and Congressional investigators.

FTC Chairman Dixon says he expects to conduct wide-scale investigations of entire industries.

Senate antitrust and monopoly subcommittee chairman, Sen. Estes Kefauver, for whom Mr. Dixon used to work, has announced plans to investigate the whole question of antitrust violations. Senator Kefauver says he plans to find out if the antitrust laws need tightening.

Close-ups Of
INDUSTRIAL JAPAN

Part 2

Labor and Unions in Japan

It's difficult to measure strength of Japanese labor unions by U. S. standards. The same goes for labor costs.

When you get through figuring in all the factors, Japanese labor is not always "cheap."
By Tom Campbell

■ The spring drive for an annual wage increase is in full tilt in Japan. Labor unions and workers are now "playing the game" with management. The end will mean a wage increase just in time to be followed by the summer drive for the semi-annual bonus.

Negotiations, bargaining, courteous strikes, and notifications are never through in Japanese industry. But there is an interesting difference between some of our union actions at home and those here in Japan.

Big Production—When the labor union in Japan decides on its plan to negotiate its demands, it sets up a complete schedule of rallies, strikes, stoppages, and meetings. Management knows in advance when all these events will take place. The shutdowns are never for more than 72 hours. Japanese labor never wants to run the risk of damaging the equipment it feels gives it its life work. So all is quite cooperative.

Are unions strong in Japan? Yes, from the Japanese standpoint. No, from the standpoint of American labor unions. There are national unions here, but they are political organizations. As such, they are also

AT WORK: Lathe operator Tatsuo Hori is a typical Japanese skilled worker living and working in Tokyo.

AT HOME: Workers like Tatsuo Hori often spend evenings watching TV while sitting around the hibachi.

DEMONSTRATION: Worker demonstrations, which sometimes result in police actions, are carefully staged.

socialistic. But they have little real power (at the moment, at least) over the hundreds of affiliated unions which are units at the plant level.

Union Machinery — In order to clarify some of this paradox, let's take an example of a local union which is about to negotiate with management. This could be in steel or any industrial plant. The union has a strong loyalty to the plant and to its machinery and management. The union unit makes up its demands and informs workers and management what its schedule will be. This includes when and where rallies will be held, when a short strike is scheduled, and how long it will last.

Because management has a deep sense of duty toward employees, welfare demands are often met and a contract signed before the complete schedule of rallies, shutdowns, and meetings has been run through.

At the Local Level—The national unions will demand this or that, with the usual socialistic language in its demands. However, there is no industry-wide bargaining done in Japan. It is all on a local plant level. So while the national unions, to which most of the smaller units belong, are haranguing the workers and the public, the local unit goes calmly on its way toward an amicable settlement.

Some of the union leaders here are aghast at the length of the last steel strike in America. They cannot grasp how plants could be shut down so long without extensive damage to the plant. Union officials here are only learning of the banking of blast furnaces and cooling of open-hearths.

Won't Happen Here—But it is doubtful if they ever would try to do this in the Japanese steel industry. The fear of hurting their means of livelihood is so strong that it is doubtful if a strike or stoppage of more than 72 hours can be expected in the next several years. At least, that is the opinion of an outstanding Japanese labor leader.

It may be, according to a Japanese labor expert, that when the Japanese worker develops a sense of economic consciousness, he may change his tactics within his local unions. But for the time being, management has the "duty" to look after its workers. And, since the workers are hired for life, it is inconceivable for them to run a risk of harming the plant, the management, or any other means of getting the raises they know they will get eventually.

International Comparison—It is quite difficult to compare the Japanese unions with our unions in America. The basic philosophy of Japan is quite different. Here, labor and management are but a few years from a feudal system that took care of the worker from birth to death. Now, that general idea is embedded in labor pacts made by unions and management at the plant level.

To expect a sharp change in this pattern in the foreseeable future would suggest that a vast change in the mores of the nation was about to emerge. It isn't.

Law Changes—There is legisla-

NEXT WEEK

RAW MATERIALS

As an over-populated island nation, Japan has a tremendous problem supplying its industry with raw materials. In Part III of this series of reports from Japan, Editor-in-Chief Campbell analyzes how Japan is solving this critical problem.

tion favoring employees, but most of the medium and large-size firms have already provided for anything in the law. This is because of the paternalistic attitude of management. It is also because of the basic Japanese culture of doing something for the other person rather than for himself. If this appears to be unusual, it would be so only because we are dealing with the Oriental attitude. It often cannot be compared with or measured by our Occidental industrial relations.

Working Conditions—The working conditions and wages that apply to the larger industries do not always apply to the so-called cottage industries. In those, work is done at home with only a few employees. The head of the house is the boss. There are many thousand cottage plants throughout Japan.

But there is vast growth in the number of small plants which employ 25 to 150 workers. They are in the parts-making business for products like TV sets, radios, cameras, autos, and any number of appliances and other consumer products. These plants have worked long and hard at making productivity gains and are now showing results.

Know Your Worker—But going back to Japanese unions, there are major misconceptions over Japanese labor rates. Of course, even in the U. S., wage rates vary widely depending on the industry, craft, or specific job.

In Japan, it is more complicated than that. For that reason, it is difficult to measure gross wage rates against those in the U. S.

Certainly to refer to Japanese wage rates as "cheap," goes wide of the mark—at least from the viewpoint of management and labor in Japan. There are many components of the total wages paid in Japan. So many that it is most difficult to equate them to the U. S.

Here are the factors that enter into many of the total wage costs in many Japanese industries:

Base Rates: Just like in the U.S. The base rate is that paid for an 8-hour day; 48 hours a week.

Overtime: They do not like to work overtime in Japan, but a special rate is paid when workers do.

Components Forming Bases: These vary. But the vast number of factors involved show the complexity. Here are the components: Age, education, length of service, ability, position, qualifications, type of job, job ranking, special duties and shift differentials.

Amenities: This is where you could go wrong in judging Japanese wage costs if you failed to take into account these factors: Housing, meals, commissary, aid in financing, children's facilities and educational aids, medical and dental care, barber shops and baths, high company bank interest rates.

Longevity: This is a graduated wage increase based on length of service and is included in the component for base rates. The point here is that the wages are higher on seniority without regard for ability, etc.

Bonus: There is the summer bonus which runs about four months' pay. There is also the year-end bonus which runs about three months' pay. That means a bonus of seven months' pay each year.

This will give a faint idea of what goes into wage costs in Japan. Since a man stays with a firm for life (he is NOT laid off), and since he gets a pension when he is 55 years old, it is obvious why Japanese businessmen regard the term "cheap labor" as an indirect insult—to the Japanese facts.

Reprints of this article are available as long as the supply lasts. Write Reader Service, The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

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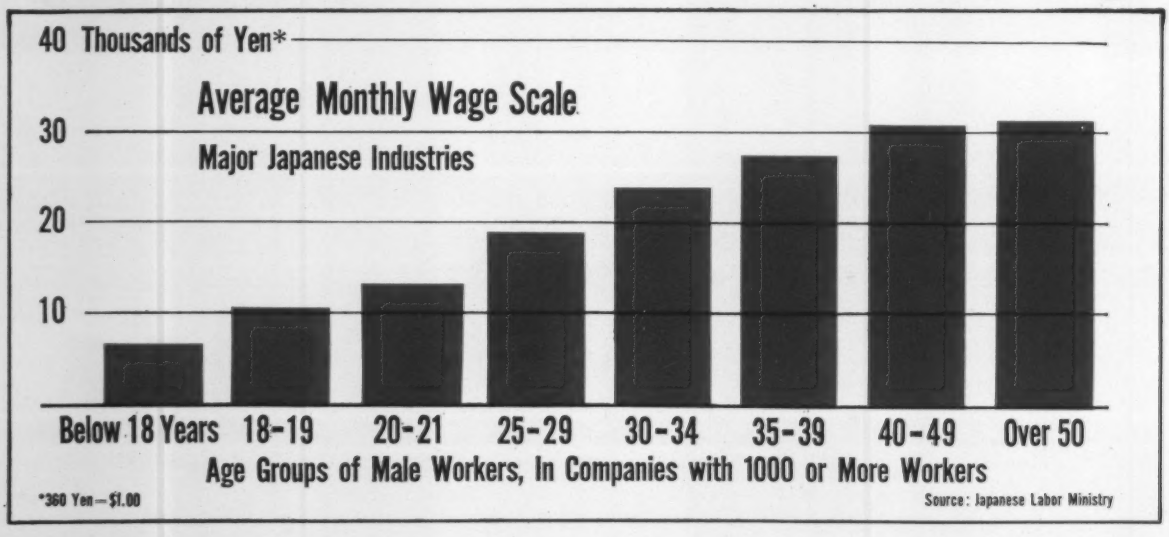
Japanese Wage Scale Is Tied to a Worker's Age



INDUSTRIAL BRIEFS

April Meeting—The 14th annual college-industry conference of the Foundry Educational Foundation is scheduled for Cleveland, April 19-20. The conference will show how engineering know-how is being applied to foundry operations.

Welded Month—U. S. Governors and Mayors will proclaim April as National Welded Products Month. The International Institute of Welding will hold its annual meeting in the U. S. for the first time, April 10-15, at New York.

Guest Faculty — A communications "brain trust" of experts from industry, science and government will be the guest faculty at Colorado State University summer institute in technical and industrial communications. The workshop will be held July 10-14.

Hot Dip Awards — Ten $1000 awards are being offered by the American Hot Dip Galvanizers Assn. for ideas developing new markets and applications for hot dip galvanizing.

Metal Winner—Dr. Claude L. Clark, Timken Bearing Co., will receive the Albert Sauveur achievement award at the American Society of Metals congress and exposition in Detroit, October 23-27.

Electronics Award — Dr. Jerome B. Wiesner, President Kennedy's special assistant for science and technology, will receive the Electronic Industries Assn. medal of honor at the EIA convention in Chicago in May.

Acetylene Medal — Elmer H. Smith, chairman, Smith Welding Equipment Corp., Minneapolis, will receive the International Acetylene Assn.'s James Turner Morehead Medal during the convention in Boston, April 25.

Metal Officers—J. R. Sternberg, Consolidated Hide & Metal Co., Asheville, N. C., was elected president of the Metal Dealers Div., National Assn. of Secondary Material Industries, Inc. Ben Kaufman, Ajax Metal Div., H. Kramer & Co., Philadelphia, was elected president of the Secondary Metal Institute.

Kaiser Honored—The St. Paul Home Builders Assn. selected Kaiser Aluminum & Chemical Sales, Inc., as the first private enterprise to receive the award for outstanding service to industry and community.

Can Makers Elect—Reuben L. Perin, Continental Can Co., was named president of the Can Manufacturers Institute.

Computer Complex — De Laval Steam Turbine Co. is installing the largest industrial computer complex in the Trenton, N. J., area. It will further mechanize De Laval's data processing and increase its engineering and research computation work.

Double Expansion—Timesavers, Inc., Crystal, Minn., is doubling its plant size. The sanding and finishing machinery manufacturer plans a 10,000 sq ft expansion at the present plant site.

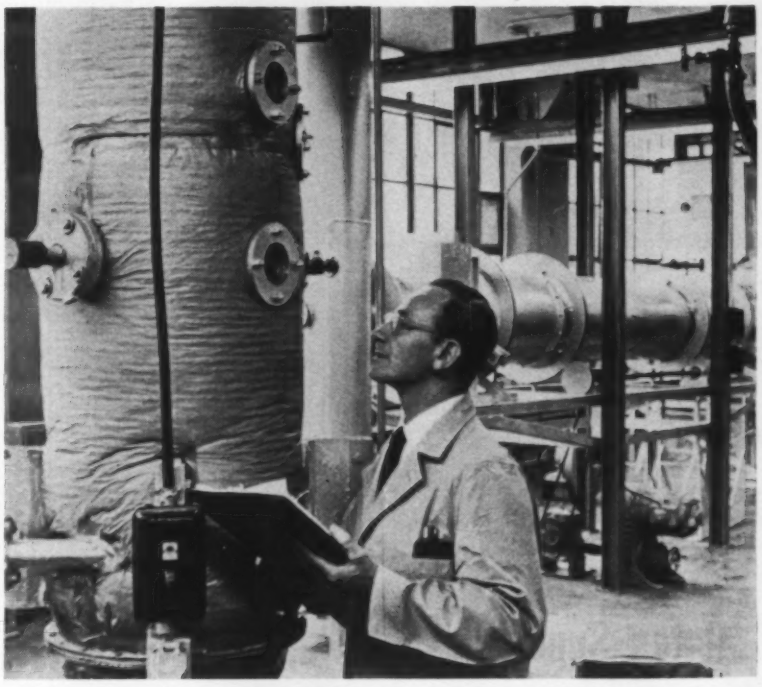
On-Site Oxygen — Linde Co., Div., Union Carbide Corp., has completed its new oxygen plant at Emery Industries, Inc., Cincinnati. It is the first on-site plant designed to produce high-purity oxygen for conversion to ozone.

Man-Made Mica — Electronic Mechanics, Inc., is completing the world's largest facility to produce man-made mica at Clifton, N. J. It will have a capacity of 500 tons annually.

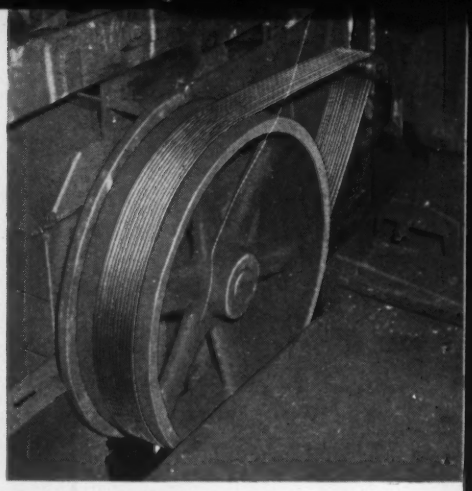
Gear Center—Ohio Gear Co. has opened a new distribution center for stock gears and speed reducers at San Francisco.

All Together—Atkins Saw Div., Borg-Warner Corp. has moved plants and offices from Indianapolis to Greenville, Miss.

Industry Breakthrough: Alumina From Clay



KEY STEP: Olin Mathieson Chemical Corp. announced a major breakthrough in the search for a commercially practical way to make aluminum from common clay. Research technician checks operation of a small pilot crystallizer used in the process of purifying aluminum sulfate—a key step in producing alumina from clay and shales.



GATES SUPER HC DESIGN ELIMINATES SPEED REDUCER

...saves $500

The 20" x 40" single-roll crusher shown above is used by the Middle Pennsylvania Coal Corp., Madera, Pennsylvania, for the primary crushing of bituminous coal.

Originally, because of space limitations with a conventional V-belt drive, a speed reducer was required in lowering the 1800 rpm motor speed to 140 rpm for the crusher.

In designing the drive for this crusher, C. W. Davis, president of the coal company, was assisted by the Gates Field Engineer for the mid-Pennsylvania area.

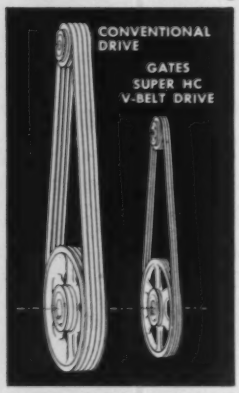
They found that by using a compact Gates Super High Capacity V-Belt Drive, a direct reduction of speed could be accomplished, eliminating the speed reducer. At their request, the crusher manufacturer grooved the 36" flywheel to handle Super HC Belts instead of conventional B-section belts.

Mr. Davis tells us, "By using the Gates Super High Capacity V-Belt Drive, we were able to save about $500 on the installation."

Your nearby Gates Field Engineer is an experienced, fully-qualified drive design expert. To contact him for help in designing a new drive, or for quick delivery of replacement V-belts, call your nearby Gates Distributor.

Designing a new drive?

Gates Super HC High Capacity V-Belts save drive space, weight, money



If you are designing a new drive, or if the belts and sheaves of a conventional V-belt drive must be replaced, you will benefit many ways by installing a Gates Super High Capacity V-Belt Drive.

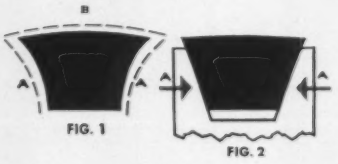
Gates Super HC V-Belt unites new, high performance materials with a basic change in the shape of the belt itself. Because of this, it is able to handle up to 3 times the horsepower of a conventional V-belt in the same space . . . cut drive costs as much as 20% . . . and reduce drive weight 20% and more. Guards can be smaller. Bearing loads are less, increasing bearing life. And the drive can operate at belt speeds up to 6000 ft/min without dynamic balancing!

Need replacement V-Belts?

Longer belt life makes Gates Hi-Power V-Belts industry's No. 1 choice

• **Concave Sidewalls** (U.S. Pat. No. 1813698)—It is easy to see why Gates Hi-Power V-Belts give far longer belt life than ordinary V-belts. *Just make this simple test:* Bend a Gates V-Belt as if it were going around a sheave. Feel how the concave sides (Fig. 1—A) fill out . . . become perfectly straight (Fig. 2—A) to make full contact with the sides of a sheave. The belt thus grips the sheave evenly and distributes wear uniformly across the sides of the belt, lengthening belt life.

• **Precisely-Engineered Arched Top**—The arched top (Fig. 1—B) of the Gates Hi-Power V-Belt prevents any distortion of the tensile section cords as the belt bends around the sheave. The load is uniformly distributed with each cord carrying its full share.



Building the future on 50 years of progress

The Gates Rubber Co.
DENVER, COLORADO

BP-8

Will Borrowing Spur Business?

Earlier this year consumer repayments on instalment credit topped new borrowing for first time since September, 1958.

But to analyze the effect of borrowing on business, you must study both the short-term and long-range prospects.

■ There's always plenty of argument about how much credit the consumer will carry—and for how long.

But there's little doubt the buyer's credit views have a powerful impact on business. Credit statistics are carefully studied for clues of what's ahead.

The latest set of figures from the Federal Reserve Board show the recession really caught up with credit in January. That month repayments on instalment loans exceeded credit extensions for the first time since September, 1958.

Repeat Pattern? — Back in late 1958 repayments and new credit kept see-sawing back and forth for several months. Finally in March, 1959, credit extensions began to pull away from repayments. And they stayed above them until this January.

Long-term studies of consumer credit show buyers generally have a good idea of how much borrowing is enough. They also indicate the large-scale demands for credit in the 1950's may be tapered a little in the 1960's.

Some aspects of consumer credit in the '50's and the outlook for the '60's have been analyzed by M. S. Szymczak, member of the Board of Governors of the Federal Reserve System.

Looking Back — He points out some of the reasons why the post-World War II period brought a rapid growth in instalment credit. There was increased home ownership, the movement to the suburbs, and a growing number of two-car families.

A big factor was the rise of auto credit. At the end of 1955, total instalment credit was 12 times as high as it was 10 years earlier. However, auto credit was 30 times as high.

Since then, borrowing to own cars has lost a degree of its strength.

When 1960 ended auto credit was about the same percentage of total credit as at the close of 1953 —slightly above 40 pct. This was also about the same proportion as in 1941.

More Personal Loans—But personal loans rose from 21 pct of the total in 1953 to 26 pct in 1960. Other consumer goods paper declined from 29 pct to 26 pct of the total.

Evidence seems to indicate, even leaving recession periods out, the amount borrowed to buy cars has been declining. This is a trend that must be closely watched, Mr. Szymczak points out.

Some Long-Range Predictions

■ What are the probable future trends in credit?

Based on the patterns of the past, Mr. Szymczak makes these observations: Whether the early 1961 decline in instalment credit continues depends mainly on changes in consumer demand.

There probably won't be a major slump in consumer credit. But, in itself, consumer credit can't end the present recession.

Growth Forecast—For the long term, buyer borrowing will grow as population and income increase.

It's probable, Mr. Szymczak believes, that the credit rate will be slower than in the decade after World War II. He estimates the ratio of payments to disposable income may rise moderately from the rate of about 13 pct in effect since the second half of 1959.

Things to Watch—But he notes, "You might question how much further automobile demand can increase because of the very high number of auto ownership and multiple-car families."

Another factor difficult to analyze: Borrowing needs of the growing number of older people in the population. "This group has always accounted for a small part of the total consumer debt," Mr. Szymczak says. "But debt may rise as more older people become accustomed to using instalment credit and continue having regular incomes after retiring."

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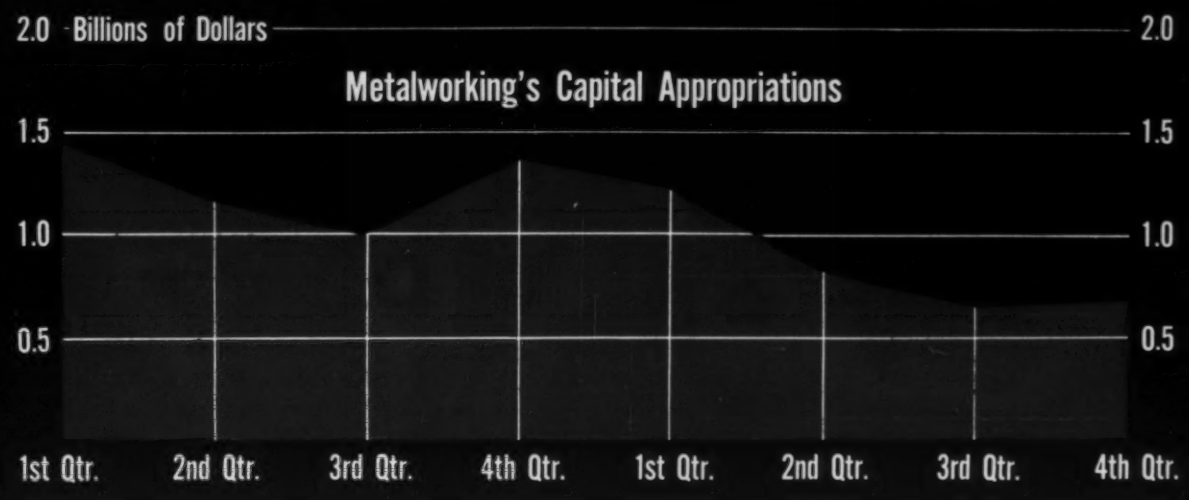


Metalworking's Capital Spending: Is There an Upturn in the Works?

First signs of comeback in new plant and equipment spending by metalworking companies are starting to show up.

New survey shows low point may have been reached in the third quarter of 1960.
By E. C. Beaudet

■ Chances are good that an upturn in plant and equipment spending by metalworking companies is now in the making. But any strong comeback in capital goods spending probably will not show up before midyear.

These are the conclusions drawn from the most recent survey of new metalworking capital appropriations conducted for The IRON AGE by the National Industrial Conference Board.

The survey shows cutbacks in new investment decisions may have reached the low point in mid-1960. In this report on the fourth quarter 1960 spending plans of 38 metalworking industries, the number of industries increasing new capital appropriations has picked up.

Better Showing—Fifteen of the 38 industries, boosted fourth quarter capital spending plans compared to fourth quarter 1959. This is a better showing than the second and third quarters when only thirteen industries advanced new appropriations over year-ago quarters.

Overall, new appropriations in the fourth quarter gained a slight 3 pct over third quarter 1960. But the downward trend from the beginning in the first quarter of the year appears to have halted.

This, and signs of strength by three out of six major metalworking groups, may be the beginning of a general upturn in the months to come.

Since appropriations lead actual expenditures by six to nine months, these encouraging fourth quarter '60 figures may be the signal for a more substantial recovery in capital goods orders from mid-1961 through the end of the year.

Topped 1958—All in all, new capital appropriations by metalworking companies came to $3.4 billion in 1960. This is about a third less than the survey record year of 1959.

But 1960 spending plans easily topped the $2.6 billion set aside in 1958. With a better showing

Metalworking's Capital Spending Plans
No. 1 of a 1961 Series

over 1958, and signs of new strength in the fourth quarter, a new rise in plant and equipment spending can be expected.

Generally, the best gains from the third to fourth quarter were posted by the electrical machinery industries. Next in line came manufacturers of fabricated metal products, then nonelectrical machinery makers.

Here's how these industries increased new appropriations from third to fourth quarter 1960: Fabricated metal products, 68 pct; electrical machinery 55 pct; nonelectrical machinery 15 pct.

Slight Gain Overall—As a whole, the 38 metalworking industries covered in the survey boosted new capital spending plans three pct over third quarter 1960. Admittedly, this is not much of a gain. The important thing is that the downtrend starting in first quarter 1960 has at least stopped.

Offsetting these gains in new appropriations were year-end declines by the primary metals, transportation equipment and instruments industries. Respectively, they lowered new appropriations 9, 24 and 28 pct.

The 9 pct third-to-fourth quarter '60 dropoff in primary metals was less than half as great as at the end of 1958. At that time a cutback by iron and steel foundries delayed the recovery in primary metals.

On a year-to-year basis, fourth quarter spending plans of primary metals producers fell about 75 pct under fourth quarter 1959. This extended the industry's downswing to four quarters in a row. And it matched the severity of the cutbacks of first half 1958 when the last recession was at a low point.

Nonferrous Off — During fourth quarter '60, the hopes of the iron and steel producers for a recovery in customers' orders were repeatedly dashed. And new appropriations in the same quarter reflect the low operating rate of the industry.

At the same time an ample supply of nonferrous metals on world markets held down nonferrous operations and exerted sharp competitive pressures upon prices.

After increasing smartly for seven successive quarters, the iron and steel foundry group cut approvals more than four fifths from a year ago in the final quarter of 1960.

Fabricators Show Rise — Metal can makers, however, hiked their new capital appropriations by about three eighths over a year-ago in the last quarter of 1960. This reversed a decline that had stretched, with but one interruption, from the second quarter of 1959.

Similarly, a 60 pct rise marked the appropriations trend in the metal stamping industry. These gains at the end of 1960 brightened an otherwise dull second-half record for fabricated metal products.

The final quarter of 1960 also witnessed a strengthening of new

Text continues on p. 88. Detailed tables listing new appropriations by 38 metalworking industries are on pps. 86 and 87.

Want 4-Year Data?

Would you like four-year data showing trends in capital appropriations by 38 industries in metalworking?

If so, write Reader Service, The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa. Ask for Reprint No. 158.

Two-Year Trend in Capital Spending Plans

Major Metalworking Groups

Industry	SIC Code	Capital Appropriations—$ Millions 1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	1960 2nd Qtr.	1960 3rd Qtr.	1960 4th Qtr.	Pct Change 4th Qtr. 1960 over 3rd Qtr. 1960	Pct Change 4th Qtr. 1960 over 4th Qtr. 1959	Pct Change 12 Mos. 1960 over 12 Mos. 1959
Metal Furniture	25	$1.6	$9.2	$1.6	$1.5	$1.6	$2.7	$3.0	$1.7	−42 Pct	+11 Pct	−36 Pct
Primary Metals	33	544.2	252.1	179.3	379.7	265.1	229.9	107.3	98.0	− 9	−74	−48
Fabricated Metal Products	34	44.3	37.1	40.8	68.9	54.2	32.8	29.6	49.7	+68	−28	−23
Machinery (ex. Electrical)	35	142.9	107.9	126.9	154.4	147.9	61.5	68.5	78.9	+15	−49	−33
Electrical Mach. & Equip.	36	62.7	95.7	120.2	74.2	91.0	66.8	46.1	71.6	+55	− 3	−22
Transportation Equipment	37	168.2	235.1	167.9	156.1	191.4	125.6	168.8	127.8	−24	−18	−16
Instruments, etc.	38	15.4	14.8	8.1	11.2	16.1	13.4	14.2	10.2	−28	− 9	+ 9
Total Reported[1]		979.2	751.9	644.7	846.0	767.3	532.7	437.4	437.9	0	−48	−32
Total Estimated for All Metalworking[2]		$1467.2	$1171.4	$1013.6	$1379.0	$1209.2	$841.0	$655.5	$677.1	+ 3 Pct	−51 Pct	−33 Pct

Based upon returns from 485 companies reporting 715 separate industry groups.
[1] Excludes ordnance and accessories, SIC Code 19, and miscellaneous manufacturing, SIC Code 39.
[2] Estimated for entire metalworking universe. This includes metalworking firms operating at least one plant employing 500 or more production workers in 1957. See coverage table, page 88.
Source: The National Industrial Conference Board.

How to Use Appropriations Data In Sales Forecasting

Here's how one company tailors appropriations data to its own sales forecasts.

With other lead indicators it's used to locate best prospects, discern future trends.

TREND WATCHERS: Marketing manager J. W. Petersen (l.), discusses latest trends with Racine Hydraulics' president John E. Erskine.

■ Sales forecasting at Racine Hydraulics & Machinery, Inc., is a harder job than in most companies.

Since Racine's major products are hydraulic components for industrial equipment, the company's sales curve moves well ahead of the general economy—both up and down. In fact, the company can almost be considered a "lead indicator" in itself.

Despite this, Racine president John E. Erskine says, "Every company does economic forecasting whether it realizes it or not. Top management decisions constantly depend on the future. And they cannot be made without some decision about what the future will be like. We have to forecast."

Aid Management—Mr. Erskine, however, points out that no economic forecast can be a substitute for experienced management judgment. "Rather," he says, "they should be used to improve our management decisions."

The problem facing his "lead" company (and industry) was to find some forecasts that would work. So, at the very beginning he laid down some ground rules for an active forecasting program: It should be simple, not overly time-consuming and come up with useable results.

In tackling the assignment the first task of Racine's manager of marketing services, John W. Petersen, was to find out if the company could use established lead indicators at all.

Check Data—To this time he has checked over 100 different series of economic data against the company's quarterly sales volume. These include the industrial production index, capital equipment expenditures and many other well-known indicators.

Actually, Mr. Petersen reports, this was not as hard as it sounds. After charting some ten to fifteen series, he could soon "picture" a curve from the figures and avoid actual charting if the "picture" didn't look like it would work out.

The objective of this study was to see if one or more of the lead indicators had a past history of anticipating the ups and downs of Racine's sales curve. The study also included a search for coincident indicators which moved at the same time as sales.

Some Surprises — Mr. Petersen points out that while it would have been nice to know the reasons for these lead and coincident relationships to Racine's sales, the first step was to find out if or where they existed.

In so doing, the company was in for a few surprises. Since Racine builds hydraulic components for capital equipment, one might assume that the company's sales would rise with capital expenditures.

Actually, Racine found that its sales curve ran ahead of capital expenditures by as much as a year. And, more often than not, the

Total Metalworking Appropriations

Customer Classes By 3-Digit SIC		Estimating Ratio, Pct	Estimated Appropriations—$ Millions							
			1959				1960			
			1st	2nd	3rd	4th	1st	2nd	3rd	4th
352	Farm Equipment	56 Pct	$33.7	$25.4	$21.1	$23.0	$18.7	$13.7	$12.9	$18.2
353	Const. Equipment	70	49.3	39.3	16.1	17.7	66.3	8.3	5.0	14.4
354 & 9	Metalworking Machy.	61	13.9	10.8	18.4	10.2	22.1	8.4	8.8	10.3
355	Spec. Ind. Machy.	48	20.0	11.2	19.2	18.1	19.6	22.5	14.6	17.5
356	Gen. Ind. Machy.	67	38.1	24.2	55.4	23.4	42.5	12.1	11.9	15.7
361	Elec. Trans. Equip.	54	15.4	26.1	104.4	28.0	18.7	25.6	8.5	28.3
371-5-9	Motor Vehicles	86	115.7	222.0	148.4	116.3	142.9	115.6	153.4	77.8
373	Ship & Boat Bldg.	50	12.8	2.6	5.4	3.2	8.6	5.0	10.6	6.4
374	Railroad Equip.	61	3.4	2.3	5.1	2.0	4.4	3.1	1.3	3.1
382	Meas. & Cont. Inst.	64	9.7	12.2	5.6	5.6	8.1	9.5	5.5	5.9

curves headed in different directions.

The chart comparing Racine's orders for hydraulic components and capital expenditures for nonelectrical machinery shows how this worked out. In 1960 while capital expenditures were on the upgrade, Racine's sales were falling off. In 1959 the pattern was pretty much reversed.

Three Clues—By this trial and error method, Racine found three indicators which ran ahead of the company's sales for the past five years. These are: Capital appropriations; screw machine product orders; and money supply.

Of the three, capital appropriations offered the most logical reasons for running ahead of Racine's sales. Also, through detailed study, specific markets for hydraulic components could be identified on an industry-by-industry basis.

The first series Racine used to anticipate sales was The National Industrial Conference Board's broader (2-digit SIC) survey of capital appropriations by durable goods makers.

The middle chart, right, shows this series lead Racine's sales by one quarter some fifteen out of eighteen times in the last four and one-half years.

Some Exceptions — One of the three exceptions took place during the Suez crisis when capital appropriations remained high in first quarter 1957 and Racine's sales dropped the following quarter.

The other two exceptions occurred at low points before an upturn and when Racine's sales showed a tendency to turn up coincidentally with (or ahead of) its normal lead indicators. Still and all, 15 out 18 is a pretty good batting average.

While the broader capital appropriations data gave Racine a sense of sales direction, Mr. Petersen's next step was to seasonally adjust the company's sales data to reflect cyclical trends more accurately.

Sharpen Tools—Since 64 pct of Racine Hydraulics' total sales are

Appropriations Weighted For Racine

Customer Classes By 3-Digit SIC		Pct of Racine Total Sales	*Weighted Values—$ Millions							
			1959				1960			
			1st	2nd	3rd	4th	1st	2nd	3rd	4th
352	Farm Equip.	3 Pct	$1.0	$ .8	$ .6	$ .7	$ .6	$ .4	$ .4	$ .5
353	Const. Equip.	7	3.4	2.8	1.1	1.2	4.6	.6	.3	1.0
354-9	Metalworking Machy.	14	1.9	1.5	2.6	1.4	3.1	1.2	1.2	1.4
355	Spec. Ind. Machy.	14	2.8	1.6	2.7	2.5	2.7	3.2	2.0	2.5
356	Gen. Ind. Machy.	7	2.7	1.7	3.9	1.6	3.0	.8	.8	1.1
361	Elect. Trans. Equip.	2	.3	.5	2.1	.6	.4	.5	.2	.6
371-5-9	Motor Vehicles	4	4.6	8.9	5.9	4.7	5.7	4.6	6.1	3.1
373	Ship & Boat Bldg.	1	.1	—	.1	—	.1	.1	.1	.1
374	Railroad Equip.	2	.1	—	.1	—	.1	.1	—	—
382	Meas. & Cont. Instr.	1	.1	.1	.1	.1	.1	.1	.1	.1
* Not seasonally adjusted.										
	Total	64 Pct	$35.3	$25.4	$24.4	$26.5	$28.7	$17.7	$13.5	$13.5

to the metalworking industry, the company turned to The IRON AGE —NICB survey of capital appropriations by metalworking companies to sharpen its forecasting tools even finer.

The detailed breakdown of the metalworking capital appropriations survey makes it possible for Racine to weight its various 3-digit industry customer groups in order of their importance to the company's sales picture.

The first step is to estimate the total appropriations of all of Racine's 3-digit customer groups. How this is done is shown in the table at the top of the opposite page.

First, the appropriations reported by each 3-digit customer group are listed (see tables pps. 86 and 87). Then an estimating ratio, showing the percent coverage of each industry (see p. 88), is applied to the reported appropriations. By applying the estimating ratio to the reported appropriations, Racine determines the total dollar appropriations made by each of its 3-digit customer groups.

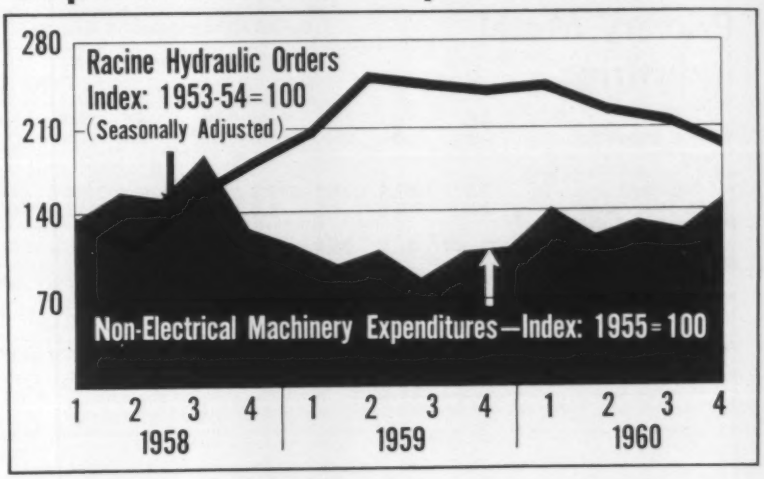
Weight Totals — Once the total appropriations for each customer group are determined, Racine weights the dollar amounts in order of their importance to total company sales. These weights and weighted dollar values of customer-group appropriations are shown in the bottom table of opposite page.

From the individual industry figures can be found clues to those industries which offer the best sales opportunities. And from the total value of weighted appropriations Racine can plot the direction of its overall sales trends.

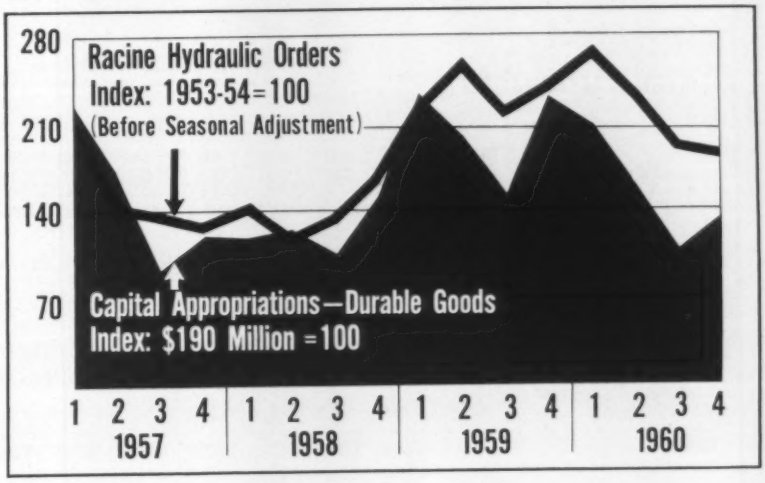
This relationship is shown in the bottom chart at right. You'll notice how appropriations lead Racine sales on the upturn in 1958 and on the downgrade in 1959 and 1960.

Brighter Signs—In the last quarter of 1960 appropriations perked slightly upward while Racine sales continued to decline. This indication, coupled with favorable signs from Racine's other two major indicators, alerted the company to its present first-quarter sales rise.

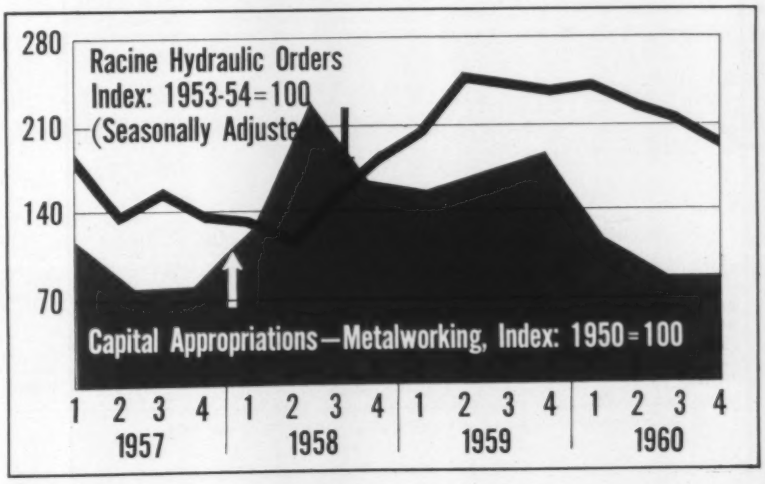
Capital Goods Expenditures



Durable Goods Appropriations



Metalworking Appropriations



Primary Metal Industries

Industry	SIC Code	Capital Appropriations—$ Millions 1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	1960 2nd Qtr.	1960 3rd Qtr.	1960 4th Qtr.	Pct Change 4th Qtr. 1960 over 3rd Qtr. 1960	Pct Change 4th Qtr. 1960 over 4th Qtr. 1959	Pct Change 12 Mos. 1960 over 12 Mos. 1959
Blast Furnaces, Steel Wks. & Rolling Mills	331	$464.2	$184.0	$113.2	$332.1	$191.2	$140.3	$43.3	$62.4	+44 Pct	−81 Pct	−60 Pct
Iron & Steel Foundries	332	10.0	8.2	8.9	8.7	13.3	12.0	16.3	1.4	−92	−84	+20
Primary Smelt. Nonferrous Metals[1]	333–334	31.9	28.4	33.0	17.5	17.4	21.4	19.3	11.9	−38	−32	−37
Rolling, Drawing, Extruding Nonferrous	335	33.9	25.3	13.6	16.0	29.1	51.9	24.6	19.3	−22	+21	+41
Nonferrous Foundries	336	0.8	3.9	7.3	2.1	4.7	2.4	1.1	1.3	+15	−38	−32
Misc. Primary Metals	339	3.3	2.5	3.2	3.4	9.4	2.0	2.7	1.8	−32	−46	+28
Total	33	$544.2	$252.1	$179.3	$379.7	$265.1	$229.9	$107.3	$98.0	− 9 Pct	−74 Pct	−48 Pct

[1] Includes secondary nonferrous smelters, SIC Code 334.

Fabricated Metal Products

Industry	SIC Code	Capital Appropriations—$ Millions 1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	1960 2nd Qtr.	1960 3rd Qtr.	1960 4th Qtr.	Pct Change 4th Qtr. 1960 over 3rd Qtr. 1960	Pct Change 4th Qtr. 1960 over 4th Qtr. 1959	Pct Change 12 Mos. 1960 over 12 Mos. 1959
Metal Cans	341	$12.0	$12.8	$9.6	$16.2	$22.2	$9.3	$6.5	$22.2	+240 Pct	+37 Pct	+19 Pct
Cutlery, Tools, Hardware	342	3.1	2.5	10.7	29.6	3.2	3.1	8.8	5.0	−43	−83	−56
Heating Apparatus (ex. Elec.) & Plumbing Fixtures	343	4.1	2.6	3.4	3.8	3.7	4.3	3.2	3.9	+24	+ 4	+ 8
Fabricated Struct. Products	344	6.6	6.7	6.0	10.1	15.0	4.2	3.4	7.9	+132	−20	+ 4
Screw Products & Rivets	345	1.9	3.8	2.3	3.7	2.1	1.3	1.1	2.0	+87	−44	−44
Stampings	346	12.4	4.4	6.2	3.0	2.6	6.4	3.6	4.7	+29	+60	−33
Coating, Engraving; Misc. Fabr. Wire Prod.	347–348	0.7	1.4	0.3	0.3	1.9	0.6	0.4	0.3	−26	− 8	+14
Miscellaneous Fabricated Metal Products	349	3.5	2.8	2.2	2.3	3.5	3.5	2.6	3.6	+38	+55	+23
Total	34	$44.3	$37.1	$40.8	$68.9	$54.2	$32.8	$29.6	$49.7	+68 Pct	−28 Pct	−23 Pct

Transportation Equipment

Industry	SIC Code	Capital Appropriations—$ Millions 1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	1960 2nd Qtr.	1960 3rd Qtr.	1960 4th Qtr.	Pct Change 4th Qtr. 1960 over 3rd Qtr. 1960	Pct Change 4th Qtr. 1960 over 4th Qtr. 1959	Pct Change 12 Mos. 1960 over 12 Mos. 1959
Motor Vehicles & Equip.[1]	371, 375, 379	$99.5	$190.9	$127.6	$98.1	$122.9	$99.4	$133.0	$66.9	−50 Pct	−32 Pct	−18 Pct
Aircraft & Parts	372	60.1	41.4	34.5	55.2	61.5	21.7	29.7	55.8	+88	+ 1	−12
Ship & Boat Building	373	6.4	1.3	2.7	1.6	4.3	2.5	5.3	3.2	−39	+105	+28
Railroad Equipment	374	2.1	1.4	3.1	1.2	2.7	1.9	0.8	1.9	+147	+57	− 7
Total	37	$168.2	$235.1	$167.9	$156.1	$191.4	$125.6	$168.8	$127.8	−24 Pct	−18 Pct	−16 Pct

[1] Includes motorcycles, bicycles and parts, and miscellaneous transportation equipment.

Electrical Machinery

Industry	SIC Code	Capital Appropriations—$ Millions 1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	1960 2nd Qtr.	1960 3rd Qtr.	1960 4th Qtr.	Pct Change 4th Qtr. 1960 over 3rd Qtr. 1960	Pct Change 4th Qtr. 1960 over 4th Qtr. 1959	Pct Change 12 Mos. 1960 over 12 Mos. 1959
Elec. Transmission Equip.	361	$8.3	$14.1	$56.4	$15.1	$10.1	$13.8	$4.6	$15.3	+235 Pct	+ 2 Pct	−53 Pct
Elec. Indus. Apparatus	362	9.0	25.7	7.3	11.4	17.2	8.2	12.1	5.9	−51	−48	−19
Household Appliances	363	8.7	10.6	6.1	4.5	7.2	5.1	4.7	7.4	+57	+64	−18
Electric Lighting & Wiring Equipment	364	2.8	5.4	3.1	6.7	6.6	11.4	3.2	6.6	+104	− 2	+55
Radio & TV Receivers	365	1.4	4.2	5.8	2.4	3.2	1.9	3.4	3.4	− 1	+42	−13
Communication Equipment	366	10.1	10.1	28.6	14.7	13.1	3.3	7.9	18.0	+127	+22	−33
Electronic Components	367	21.1	23.2	11.6	18.3	32.7	22.5	8.6	14.4	+68	−21	+ 5
Misc. Electrical Equipment	369	1.3	2.4	1.4	1.0	0.9	0.6	1.5	0.5	−67	−49	−42
Total	36	$62.7	$95.7	$120.2	$74.2	$91.0	$66.8	$46.1	$71.6	+ 55 Pct	− 3 Pct	−22 Pct

Nonelectrical Machinery

Industry	SIC Code	Capital Appropriations—$ Millions 1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	1960 2nd Qtr.	1960 3rd Qtr.	1960 4th Qtr.	Pct Change 4th Qtr. 1960 over 3rd Qtr. 1960	Pct Change 4th Qtr. 1960 over 4th Qtr. 1959	Pct Change 12 Mos. 1960 over 12 Mos. 1959
Engines & Turbines	351	$23.3	$7.0	$5.9	$23.7	$10.0	$5.0	$4.6	$8.0	+75 Pct	−66 Pct	−54 Pct
Farm Machinery & Tractors	352	18.9	14.2	11.8	12.9	10.5	7.7	7.2	10.2	+41	−21	−39
Construction, Mining, Handling Equipment	353	33.8	27.5	11.3	12.4	46.4	5.8	3.5	10.1	+186	−18	−24
Metalworking Machinery & Equipment[1]	354, 359	8.5	6.6	11.2	6.3	13.5	5.1	5.4	6.3	+15	0	− 7
Special Indus. Machinery	355	9.6	5.4	9.2	12.3	9.4	10.8	7.1	8.4	+19	−32	− 2
General Ind. Machinery & Equipment	356	25.5	16.2	37.1	38.2	28.5	8.1	8.0	10.5	+31	−73	−53
Office & Store Machines	357	21.0	27.7	35.6	45.7	26.5	15.6	27.4	18.6	−32	−59	−32
Service Industry Machines	358	2.4	3.1	4.8	3.0	3.1	3.5	5.4	6.9	+28	+132	+43
Total	35	$142.9	$107.9	$126.9	$154.4	$147.9	$61.5	$68.5	$78.9	+15 Pct	−49 Pct	−33 Pct

[1] Includes miscellaneous, nonelectrical machinery, SIC Code 359.

Instruments

Industry	SIC Code	Capital Appropriations—$ Millions 1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	1960 2nd Qtr.	1960 3rd Qtr.	1960 4th Qtr.	Pct Change 4th Qtr. 1960 over 3rd Qtr. 1960	Pct Change 4th Qtr. 1960 over 4th Qtr. 1959	Pct Change 12 Mos. 1960 over 12 Mos. 1959
Laboratory, Scientific & Engineering Instruments	381	$5.3	$4.7	$2.5	$4.7	$5.1	$4.8	$4.9	$3.0	−38 Pct	−36 Pct	+ 3 Pct
Measuring & Controlling Instruments	382	6.2	7.8	3.6	3.9	5.2	6.1	3.5	3.8	+ 8	− 3	−14
Other[1]	383, 4, 5, 6, 7	3.9	2.3	1.9	2.6	5.7	2.5	5.8	3.4	−41	+33	+64
Total	38	$15.4	$14.8	$8.1	$11.2	$16.1	$13.4	$14.2	$10.2	−28 Pct	− 9 Pct	+ 9 Pct

[1] Includes optical instruments, surgical instruments, ophthalmic goods, photographic equipment and watches, clock-operated devices, SIC Codes 383, 384, 385, 386, 387.

Survey Coverage of Plant Workers

All companies in the industries listed below, with plants of 500 or more plant workers were queried. They account for about two-thirds of the total employment and buying power in the metalworking industry. The fourth column shows the percentage of production workers employed by the companies cooperating in this survey. The last column shows appropriations per production worker.

Industry and SIC Code	Production Workers, Thousands	Production Workers, Thousands	Pct of Total Employment	Appropriations per Production Worker,[1] $
	Companies With Plants of 500 or more	Cooperating Companies	Cooperating Companies	
Metal Furniture, 251, 252, 253, 254, 259	31	12	38 Pct	$765
Blast Furnaces, Steel Works, Rolling Mills, 331	595	313	53	1,395
Iron and Steel Foundries, 332	81	61	75	705
Primary & Secondary Smelting, Nonferrous, 333, 334	54	50	92	1,406
Rolling, Drawing, Extruding, Nonferrous Metals, 335	114	80	71	1,552
Nonferrous Foundries, 336	19	13	67	755
Misc. Primary Metals, 339	37	22	59	725
Metal Cans, 341	47	45	95	1,350
Cutlery, Hand Tools, Hardware, 342	54	35	65	568
Heating Apparatus (except elec.) & Plumb. Fixtures, 343	34	21	62	722
Fabricated Struct. Prods., 344	60	30	50	1,156
Screw Prods. & Rivets, 345	26	15	60	422
Stampings, 346	75	54	71	403
Coating, Engraving; Miscellaneous Fabricated Wire Products, 347, 348	21	10	47	330
Mis. Fab. Metal Prods., 349	54	36	66	370
Engines & Turbines, 351	71	58	82	471
Farm Mach. & Tractors, 352	60	34	56	1,046
Construction, Mining Handling Equipment, 353	111	78	70	842
Metalworking Machinery & Equipment, 354, 359	105	64	61	472
Special Industry Mach., 355	47	22	48	1,589
General Industrial Machinery & Equipment, 356	92	62	67	889
Office & Store Machines, 357	78	58	74	1,531
Service Ind. Machines, 358	38	22	59	840
Elec. Trans. Equip., 361	90	49	54	901
Elec. Ind. Apparatus, 362	134	65	48	670
Household Appliances, 363	96	46	48	527
Electric Lighting & Wiring Equipment, 364	55	30	54	934
Radio & TV Receivers, 365	71	27	38	442
Communication Equip., 366	113	52	46	824
Electronic Components, 367	95	62	65	1,262
Misc. Elec. Equipment, 369	27	8	30	432
Motor Vehicles & Equip., 371, 375, 379	638	546	86	757
Aircraft & Parts, 372	522	481	92	361
Ship & Boat Building, 373	61	31	50	500
Railroad Equipment, 374	43	26	61	279
Laboratory, Scientific & Eng. Instruments, 381	41	16	39	1,125
Measuring & Controlling Instruments, 382	41	26	64	710
Other, 383, 384, 385, 386, 387	77	20	26	863
Total	4,008	2,680	67 Pct	.....

*** Based upon returns from 481 Companies reporting 715 individual industry codes. Employment figures based on Iron Age Census data, 1957. Figures in last column calculated from unrounded data. Over 1,200 plants with 500 or more production workers reported.**

[1] In dollars per production worker, based on appropriations made from first quarter 1959 through third quarter 1959 and plant employment of reporting companies in 1957.

SOURCE: The National Industrial Conference Board.

(Continued from p. 82)

appropriations in the metalworking equipment, construction and mining machinery, and farm equipment industries.

Double Outlays—New appropriations for plants and equipment by the service machine industry advanced above year-ago levels for five successive quarters. They more than doubled in fourth quarter '60.

In the last quarter of 1960, gains of more than three fifths and two fifths, respectively, improved the appropriations trends of the household appliance, radio and TV makers.

Cutbacks in the second and third quarters of 1960 were similarly reversed during the fourth quarter by the electrical transmission and communication equipment industries. The $3.3 million gain over fourth quarter of 1959 posted by the communication equipment makers was the largest dollar increase in the electrical machinery field.

Auto Makers Off—Faced with lagging sales, the automotive industry cut its new capital investment plans by almost a half in the second quarter of 1960.

This followed four quarters of dramatic year-to-year boosts. In the third quarter of 1960, approvals matched those of a year earlier, but in the fourth quarter they fell a third. This reduction brought fourth-quarter appropriations for all transportation equipment industries about a sixth under the 1959 rate.

In contrast to the motor vehicle group, the other divisions of the industry—aircraft, shipbuilding, and railroad equipment—in fourth quarter '60 matched or exceeded new outlays in fourth-quarter '59.

The shipbuilding industry, especially, reflected in its capital spending programs a strong and steady pattern of recovery from 1959.

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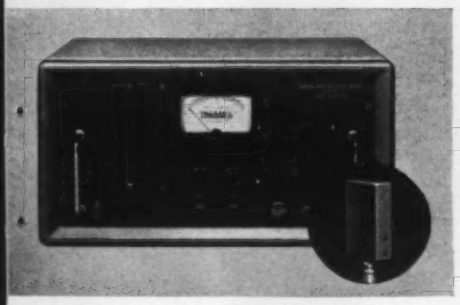
NEW ADVANCEMENTS ON THE METAL FORMING FRONT

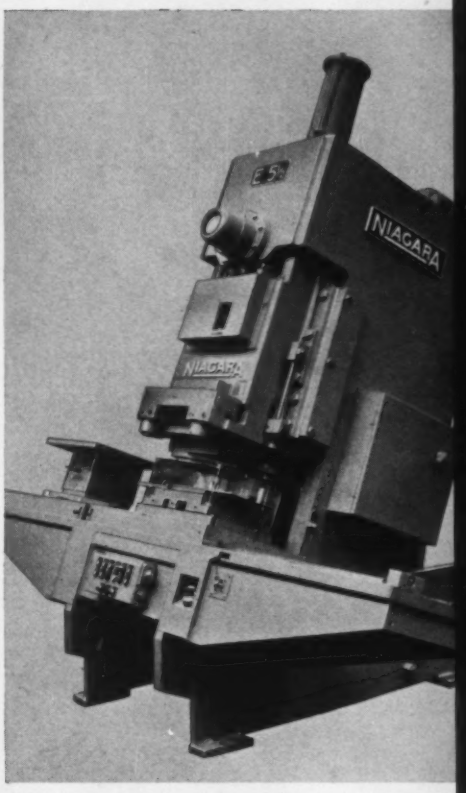


ELECTRONIC PRESS LOAD MONITOR ACTUATES SIGNAL OR DISENGAGES CLUTCH WHEN OVERLOAD OCCURS

Niagara's new Press Load Monitor, an electronic precision instrument, continuously measures and visually indicates all loads on a press during die setup or production. When a preselected press load is reached, a tripping circuit disengages the clutch to prevent overload repeats, or actuates a warning signal. Consisting of 2 or 4 pickups mounted permanently to press frames or tie rods, and a control unit located near the press, Load Monitor instantly indicates press loads from 0 to 140% of press capacity regardless of press speed. Key-locked controls prevent tampering by unauthorized personnel. Request *Product Report No. 2.*

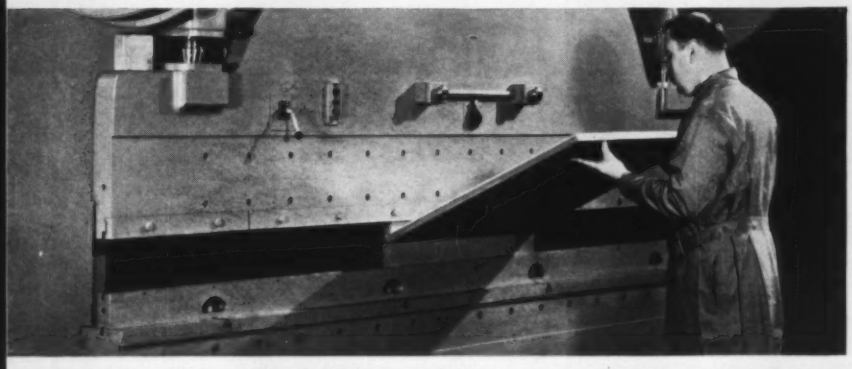
PORTABLE ELECTRONIC TONMETER MEASURES LOADS TO SAFEGUARD DIES AND PRESSES

The Niagara Portable Transistorized Tonmeter is an accurate, fast-response instrument for measuring loads imposed on a press or battery of presses during production or die setup. Pickups placed on press frames sense the intensity of loads. Large indicator, reading in percentage of press capacity, shows the maximum load during the press cycle. Because battery-powered unit requires no electrical outlet and is easy to carry, one individual can check several presses in minutes. Unit is designed to prove its calibration and test its own battery to be sure operating power is within prescribed limits. Request *Product Report No. 2.*



SLIDING BOLSTER PRESSES SLASH DIE CHANGEOVER TIME

Niagara presses arranged with Sliding Bolsters save hours of setup time on work requiring frequent die changes. On inclinables, straight sides, or other Niagara presses, sliding bolsters permit die removal or replacement in minutes instead of hours. Floating on a "cushion of air," dies can be easily moved into and out of work area by hand. Optional features for the slide may include power or manual die clamps, power or manual slide adjustment, shut height position indicator, semi-automatic slide positioner. Request *Product Report No. 1.*



AUTOMATIC STROKE CONTROLS PREVENT PRESS BRAKE "WHIP-UP"

Two automatic stroke control systems recently developed by Niagara are making new press brake efficiency and operating safety a reality.

The first, an Alternating 2-Speed Stroke Control, for press brakes with air clutches, increases production by providing a positive means of avoiding "whip-up" and "back bending" during high speed operations involving wide sheets. Following a fast approach, ram speed is automatically reduced during the working portion of the stroke, then automatically increased for a fast return to top of stroke. Because slipping the clutch is no longer necessary, less operator skill and experience are required. Clutch burnouts are prevented. Work spoilage resulting from back bends is eliminated. Selector switch offers choice of three stroke-speed combinations. Request *Product Report No. 3.*

The second, an Automatic Ram Arrestor, is available for both air and mechanical clutch machines. Following a fast approach, ram is automatically *stopped* at a predetermined point just before it touches the work. Ram can then be "inched" through the bending portion of the stroke, avoiding whip-up and back bending. It may then be returned to top of stroke at high speed. Since inching is confined to such a small portion of the stroke, operating cycle is faster... operator fatigue and clutch wear are reduced. Even inexperienced operators can perform safely and efficiently with minimum work spoilage. A single adjustment permits the stopping point to be matched to die and material. Request *Product Report No. 3.*

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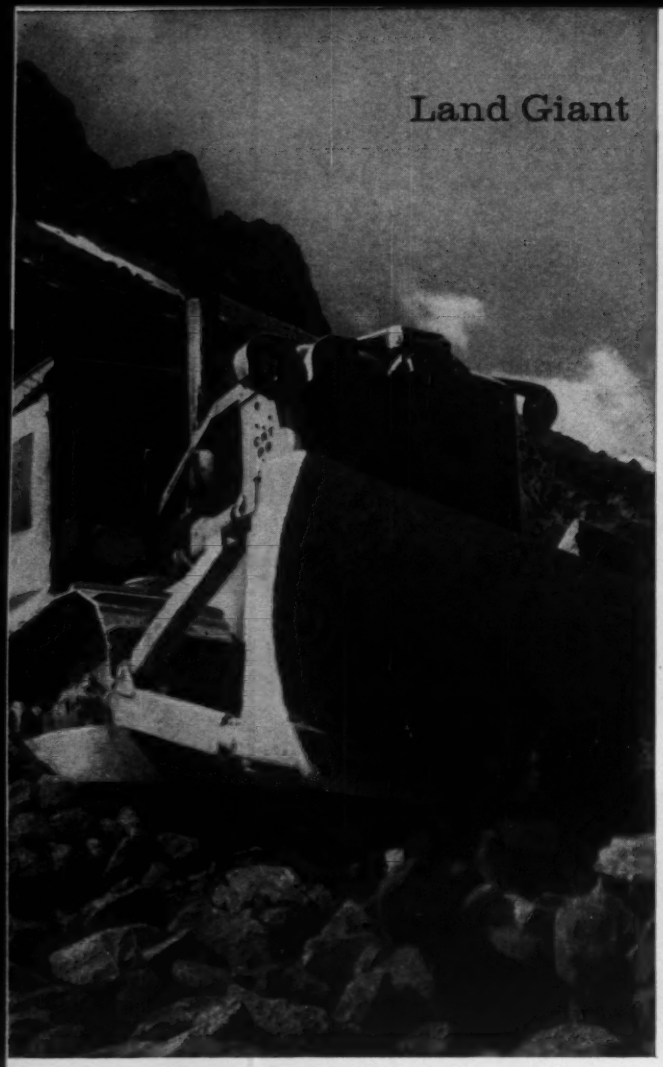

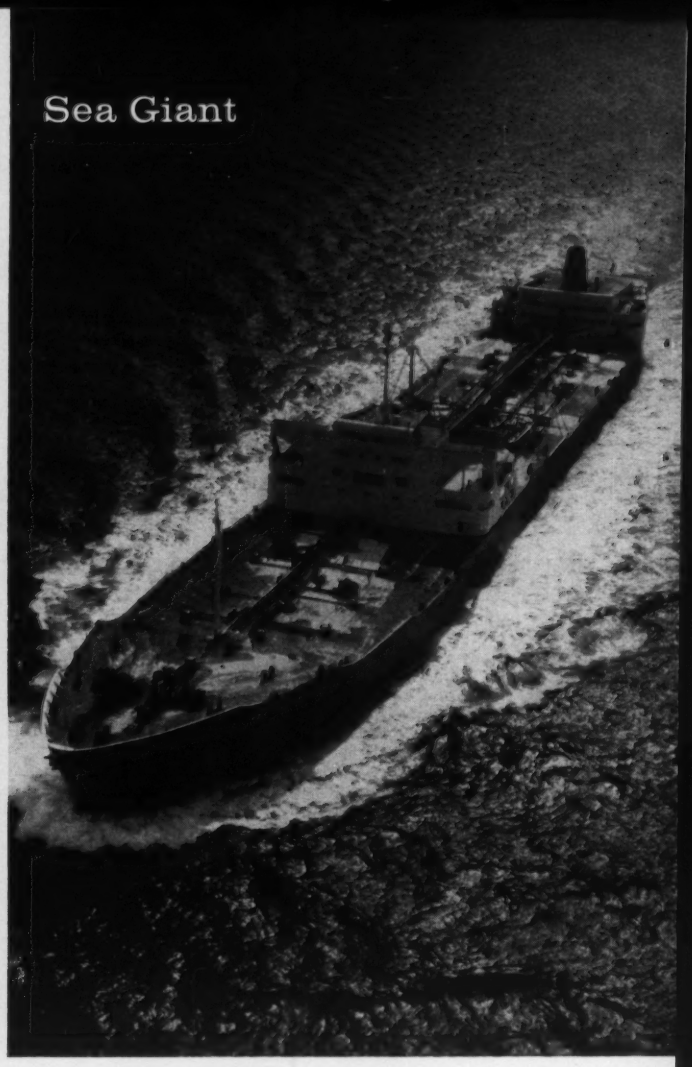

When reliable welding comes first so do M&T Murex Electrodes

THAT HUGE TRACTOR is a mountain of earth-moving muscle capable of 67,000 pounds of pull. An average tractor is dwarfed by this monster: 23 feet long and weighing over 75,000 pounds with equipment. On its seven-roller tracks, it can claw into the earth, push huge boulders, maul tons of dirt.

THE PRINCESS SOPHIE is just as much a giant of the sea lanes. When loaded, it displaces 100,000 tons—more than any passenger or military ship afloat. The latest electronic equipment, a foam fire-protection system, a complete hospital and air-conditioned quarters make it one of the safest, most luxurious supertankers ever.

Another interesting fact about these two giants: both obtained the proper joint strength through welding with M&T Murex electrodes. It's interesting, but not unusual. You'll find that this brand is increasingly in evidence at demanding jobs everywhere. It represents one of the broadest lines in the industry: over 1000 types and sizes for virtually any type of application—as advantageous on the routine jobs as on the extraordinary ones.

To get the whole story on this outstanding line, call in your M&T welding specialist. Or write for your copy of the helpful M&T Murex Electrode Selector.

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Compacts Follow Corvair Lead

Monza Success Paves Way for Similar Luxury Models

The success of the Corvair Monza induced other compact carmakers to market similar models.

The Monza proved there is a place for the luxury look in the compact car field.

By A. E. Fleming

■ If imitation is the sincerest form of flattery, Chevrolet must be bursting with pride these days. The success of the Corvair Monza is inducing other compact car makers to market similar models.

The Monza sport coupe came out last May. At once it injected zip into Corvair sales.

Its introduction was not without criticism, however. Dissenters wondered what compact car buyer would part with an extra $200 for such "unnecessaries" as bucket seats and carpeted floors.

Still Growing—The answer was not long coming. In the 1961 model year through February, the Monza accounted for over 40 pct of Corvair production. The share in February alone was over 50 pct, and it's still growing.

Convinced that there is a place for the luxury look in the compact field, several other manufacturers will bring out their own spruced up versions in April. Complete with individual contoured seats and other luxury appointments, they are the Falcon Futura, the Comet S-22, a Pontiac Tempest, a Buick Special and Oldsmobile F-85. All are two-door models.

No Plymouth Yet—With Falcon and Corvair providing sport-type cars, it would seem Plymouth would come up with a similar Valiant model. None is planned at this time. But plans can change quickly. Competition might force Plymouth to put through a crash program.

Meanwhile, although Falcon sales and production continue to surpass Corvair, the margin is lower this year than last.

As a 1960 model, Falcon, number one compact seller, produced 74 pct more units than Corvair, 435,676 to 250,007. In the 1961 model year through February, the advantage was 61 pct, 228,584 to 141,550.

Corvette to Keep Fiberglass Body

Recent reports claim Chevrolet will not use fiberglass for 1962 Corvette bodies. Steel, or even aluminum, is hinted as a replacement.

Those who should know say the rumors are far off base. Corvette, they insist, will keep its reinforced fiberglass body in 1962 and will retain it as far into the future as anyone can now see.

Starfire Sales Soar

Sales of Oldsmobile's Starfire convertible, introduced in December, are running at a rate of more than 48 pct of all 1961 Olds convertible sales.

The luxury softtop with bucket seats, unique instrument console, genuine leather upholstery and specially coordinated power train is especially popular in Atlantic, Central and Midwest states.

THUNDERBIRD'S COUSIN—The Falcon Futura features a deluxe interior with bucket seats in front, simulated bucket-contoured seats in the rear, and a functional console between the adjustable front seats.

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Crucible's inside account salesman confirms availability and delivery of any specialty steel — while you're on the phone.

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— and ask to have your name added to the mailing list to receive local stock lists.

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Aerospace Spotlighted at Show

Western Metal Congress Reports Business Is Good

Emphasis was on the aerospace industry at the 12th Western Metal Congress

Exhibitors reported business is good. Despite the recession, it's better than expected.
By R. R. Kay

■ How can companies lick the cost-price profit squeeze? What's new in materials and production methods? How can products be made better, faster and cheaper?

Some answers to these problems were found at the recent 12th Western Metal Exposition and Congress in Los Angeles. The five-day show was a metalworking market place, both for ideas and new equipment.

Aerospace Emphasis — Big emphasis was on the aerospace industry. Space age materials, processes, equipment highlighted the show.

Exhibitors were asked if they were writing any orders. The consensus: Despite the recession, business is good. A lot better than many looked for.

Congress Talk—Here's a capsule rundown of views and comment at the Congress:

"We don't have good enough materials. This limits our ability to make new machines and devices."

"Much is yet to be learned about how to hold heat-treated metal component parts to accurate size and geometry."

RUST-PROOF WHEEL: A titanium aircraft wheel that can withstand 1000 degrees heat was unveiled at the Western Metal Exposition. Built by Goodyear Tire & Rubber Co., it is rust-proof and was designed to meet high-speed jet aircraft requirements.

Lockheed Stresses Job Runs 10 Years

The first flush of excitement is over. Just what does Lockheed Aircraft's $1 billion military-transport contract mean?

When the news broke, many thought that a lot of business would start streaming out to subcontractors. There's a provision in the contract that Lockheed must let out 50 pct of the work.

Divided Term — But the other day, Lockheed president C. S. Gross told The IRON AGE that the contract will run for nine or 10 years. Dividing 10 into $1 billion, that's $100 million per year.

Nickel-Dime Parts Scuttle Missiles

It's heartbreaking to lose a multi-million dollar missile. But it's criminally tragic when a costly payload blows because of a loose piece of solder within a small diode.

Yet that's just what has been happening.

"The country's space effort has been riddled with failures traceable to nickel-and-dime parts," according to William A. Fleming. He should know. Mr. Fleming is a top official with the National Aeronautics and Space Administration.

"We examined a suppliers diode inventory. Nearly every one contained a loose piece of solder," he says.

How can these costly failures be reduced? Contractors must set up foolproof checkout methods.

Quality . . . the best economy of all

He's mopping up the mess for the last time

At a leading aircraft research center, high-frequency vibration caused severe oil leakage from hydraulic lines servicing a huge wind tunnel. Many man-hours each month were wasted cleaning up the basement floor underneath, even though drip pans were used extensively.

Now, after a change to a Suntac oil, the vibration-caused leakage has been reduced to a point where "mop-up" is not needed. Hydraulic-fluid consumption has been cut by 4000 gallons a year. That's economy! That's Sun quality—the best economy of all.

If your plant is troubled with a leaky system, a Suntac antileak hydraulic oil can save you money, too. Ask your Sun representative to show you the Suntac desk-top demonstration, or write direct to SUN OIL COMPANY, *Philadelphia 3, Pa., Dept. IA-3. In Canada: Sun Oil Company Limited, Toronto and Montreal.*

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Man-Machine Teamwork Closer

New Machine Is Automated but Geared to Man's Pace

Automation is taking on more and more jobs. But there's still a need for self-control when something goes wrong.

One new machine ties in automation with live inspectors.
By R. H. Eshelman

■ As automation design becomes more sophisticated it takes on more and more jobs. Transfer lines in automotive and other mass production industries that combine machining operations with some assembly are becoming common.

But from the beginning, these mechanical robots have had to exert some self-control to keep from committing Hara Kiri when something went wrong.

An interesting extension of the capabilities of automation is demonstrated by a new machine that cooperates with a live inspector. But unlike the proposed space cyborgs —combination men and electronic machines—this transfer line allows the inspector full use of his human faculties. In fact the actual inspection operation is performed in a routine, manual manner.

Integrated Operations—The machine was designed and built by the Cross Co., Detroit, to process power-steering gear housings. It integrates deburring operations, the in-process inspection, and assembly of two components. And it handles these jobs with greater precision and in less time than required when done as separate steps. Through use of pallet holding fixtures, the irregular-shaped parts are located and clamped only once during the entire processing.

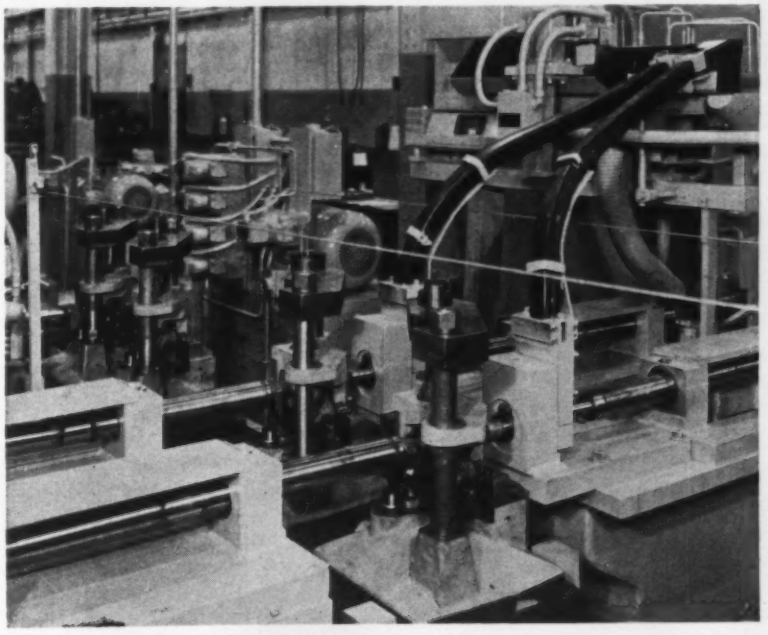
An operator loads raw castings into the pallets at the head of the line. They are processed two at a time around the closed loop track of the 38-station line. Machine operations are on a 24-second cycle. But with the dual operations, nearly 300 parts can be turned out hourly.

Open Pallets—The pallets are designed to be open on all four sides. Tools then have access to all surfaces needing work. Rotators turn the pallets 90° in two locations to expose other surfaces.

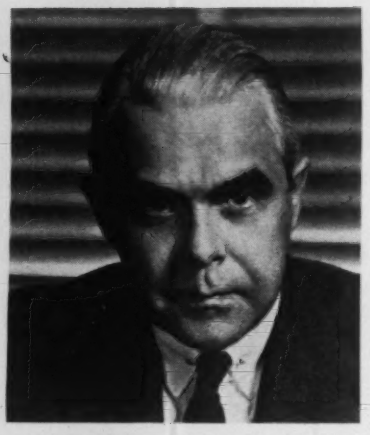
Parts are automatically aligned by an air-operated pusher at the load station and clamped by an electric wrench. Equalizing locators and clamp jaws allow for variations in castings. Machining operations include rough and finish milling, rough, semi-finish and finish boring, drilling and tapping.

The machine monitors the drills and shuts itself down when one breaks. After tapping, probes check to be sure no broken taps are left in parts. Another unusual operation is deburring, most of which is done by wire power brushes. A through hole is deburred by a fork-like tool which is pushed into the hole and deburrs coming back.

Inspection—After these stations the inspection station is provided. Roving inspectors can call off one or two pallets from the line, fill in with spares. They then check over the parts on surface plates in the inspection station, with fixed gages for rapid work. The arrangement allows checking the pallets for accuracy, too.



BUSHING BEFORE HOUSING: Automation combines in-process inspection and automatic assembly with machining for gear housings. Here, bushings are gaged for proper machining before assembly and housing.



J. B. Balmer, elected president and chief executive officer, Murray Corp. of America.

MITE Corp.—**R. A. St. Clair,** elected vice president, manufacturing; **Pelton Phelps,** elected vice president, marketing; **J. E. Lockwood,** elected vice president and treasurer; **R. M. Hirsch,** elected vice president, marketing; **Bernard Howard,** elected vice president, research and development.

U. S. Steel Corp.—**G. B. Barnes,** appointed salary administration supervisor and staff asst. to the president, American Steel & Wire Div.

F. C. Senior, elected vice president, operations, Strategic Materials Corp.

Kaiser Engineers International—**F. F. Davis,** elected vice president—Australasia and the Far East.

Lester B. Knight & Associates, Inc.—**R. L. Williams,** elected vice president, marketing div.

Hooker Chemical Corp.—**T. E. Moffitt,** elected chairman of the board and chief executive officer. Succeeding him as president is **F. L. Bryant; T. F. Willers** becomes executive vice president.

Ohio Ferro-Alloys Corp.—**David Matter,** appointed asst. vice president, Sales and Service; **S. S. Phillips,** named manager, Iron Foundry Service.

Allied Chemical Corp. — **W. C. Rueckel,** appointed vice president, Wilputte Coke Oven Div.

Plasteel Products Corp.—**S. D. Saul,** elected executive vice president.

Northwestern Steel and Wire Co. —**D. W. Lloyd,** appointed asst. to the president.

Day-Brite Lighting, Inc.—**W. C. Nusbaum,** elected vice president.

COMCO Corp.—**A. K. Thomas,** appointed vice president and general manager.

Baldwin Belting Inc.—**S. C. Klee,** elected vice president and director.

General Electric Co.—**F. M. Precopio,** named manager, engineering, Wire and Cable Dept.; **D. A. Pritchard,** appointed manager, sales, Wire and Cable Dept.; **E. F. Coakley,** named sales representative, New England District, Silicone Products Dept.

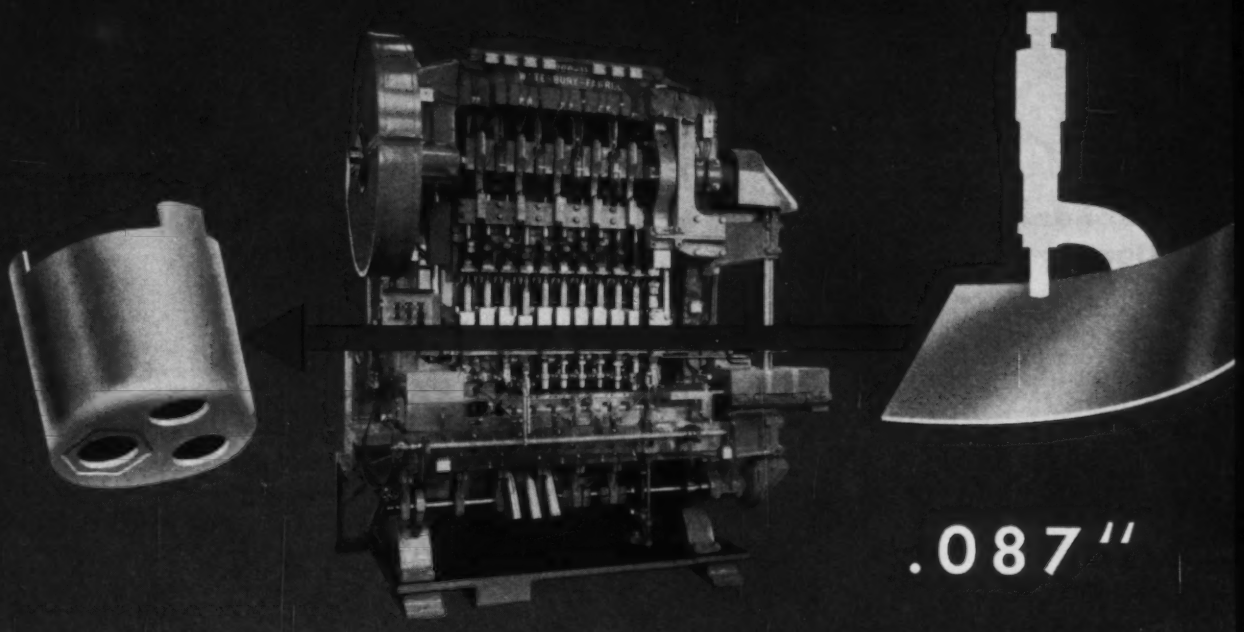
Koppers Co., Inc.—**C. W. Dahl,** named industrial relations manager, Engineering and Construction Div.

(Continued on P. 98)

G. F. Barber, appointed treasurer, Crucible Steel Co. of America.

B. E. Yarotsky, appointed asst. to the vice president, operations for administration, Crucible Steel Co. of America.

H. C. Kornman, named vice president and general manager, Engineered Fasteners Div., Townsend Co.



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WATERBURY FARREL CRANK EYELET MACHINES

Produce 50 to 70 complex, close tolerance parts per minute at low cost, from ferrous and non-ferrous strip up to .087" thick with Waterbury Farrel Crank Eyelet machines. In most cases, the parts are *finished* . . . no secondary operations required.

These rugged, multiple station machines are built in 4 sizes with from 7 to 11 operating stations. Blank diameters range up to 3¾" and the maximum shell length is 2 3/16".

These Crank Eyelet machines are part of Waterbury Farrel's wide range of both vertical and horizontal multiple station, transfer type machines which open the way to unprecedented economies in making parts from strip.

Investigate this modern cost-cutting production method by letting us analyze your drawings or samples.

WATERBURY FOUNDED 1851 FARREL

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National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

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Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

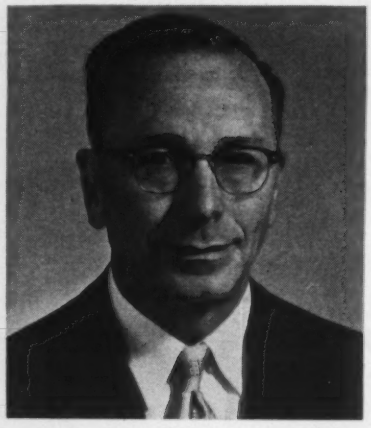
WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

(Continued from P. 96)

Townsend Co.—**P. F. Barry,** appointed asst. sales manager; **Malcolm Wilson,** appointed plant manager at Ellwood City.

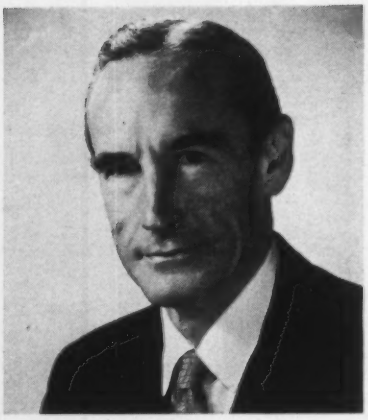
Morse Twist Drill and Machine Co. — **J. A. Guilmette,** appointed technical field engineer; **Maury Seeley,** appointed West, South, Central sales representative.



Ernst Wiedmann, named vice president and director of engineering, Oilgear Co.

Brown & Sharpe Mfg. Co.—**Edward Kibbitt,** appointed supervisor of subsidiary operations; **H. A. Szostek,** appointed district manager, Eastern sales district; **F. E. Montie,** appointed factory manager, Greystone plant; **T. R. Hall,** appointed plant superintendent, Greystone plant.

Jonathan Smith, appointed vice president, sales, Sunbeam Equipment Corp.



F. R. Curry, elected chairman of the board and chief executive officer, M. H. Treadwell Co.

Westinghouse Electric Corp.—**Drayton Heard,** named manager of apparatus advertising; **S. F. Johnson,** named sales promotion manager, Pacific Coast region in San Francisco; **E. H. Jacobs,** named sales promotion manager, Northeastern region.

Chicago Screw Co. — **E. A. Smith,** named chief product engineer; **C. G. Mackie,** named chief engineer, new products development.

F. H. Gerlach, elected vice president, engineering, DeWalt, Inc.

Chrysler Corp.—**C. S. Keller,** appointed manufacturing manager, Kokomo, Ind.; **F. O. Anderson, II,** appointed plant manager, American Foundry plant, Indianapolis.

(Continued on P. 101)

Tool and Hardware Manufacturers Use Malleable for the Parts They Guarantee...

"Guaranteed Against Warping or Breaking" is the seal of quality often found on tools and hardware made of Malleable iron. Frequently Malleable components are guaranteed while the other materials in the same tools are not.

Proven performance superiority has induced many tool and hardware manufacturers to switch to Malleable castings so they, too, can guarantee their products. At the same time, they often reduce their costs. How? Because Malleable provides more strength per dollar than any other metal; Malleable is the most machinable of all ferrous metals of similar properties; Malleable is truly outstanding for its toughness, ductility, castability and corrosion resistance. While Malleable's natural appearance is attractive, a wide variety of finishes can be applied for added customer appeal.

Improve your products by using Malleable castings. Check with any Malleable producer that displays this symbol —

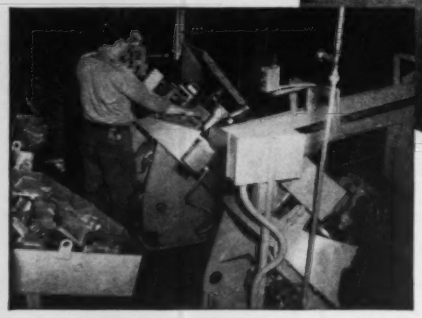
MEMBER

MALLEABLE

CASTINGS COUNCIL

Profitmaking Ideas are yours free in our Data Unit No. 114, available from any member foundry, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

The manufacturer of this unit converted his entire line of machinist vises to Malleable...then guaranteed them against breakage. Not one claim has been made in three years!



Operator loads automatic rotating TOCCO fixture for hardening rear spring hangers.

The job they said "couldn't be done"

now being hardened—1 every minute

with TOCCO* Induction Heating

This unusually shaped part is a rear spring hanger used in the spring suspension system of a major truck manufacturer. The hardness pattern covers the "flat" section, which actually isn't flat but blends two widely varying radii, and the sides or "ears" a portion of which must be hardened to the same depth—.060" to .090". Nine of these irregularly shaped castings are loaded in a rotating fixture and scanned progressively by a TOCCO inductor block at the rate of one per minute. An air gap of .060" is maintained between the inductor and the part—quite a tricky achievement since the spring hangers are unmachined castings with normal foundry tolerances of ±.045".

This job is typical of many where TOCCO engineers have worked out a satisfactory and reliable production setup for a supposedly impossible heating job. If you have a difficult heating job—hardening, brazing, soldering or heating for forming or forging it will pay you to consult TOCCO—without obligation, of course.

TOCCO

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Company_____

Address_____

City_____ Zone____ State_____

(Continued from P. 98)

Fairmont Aluminum Co.—**J. R. Petty,** named manager, branch sales office in Milwaukee.

Ford Motor Co.—**L. W. Tobin, Jr.,** appointed executive asst. to the vice president.

Dollin Corp.—**A. M. Cirelli,** appointed customer service manager.

R. L. Aughenbaugh, named manager-manufacturing for heat processing equipment, Industrial Heating Dept., General Electric Co.

Kaiser Steel Corp.—**D. L. Flohr,** appointed manager, systems and procedures, Fontana Plant.

Dravo Corp.—**D. R. File,** appointed manager, Keystone Div. Rochester, Pa. plant.

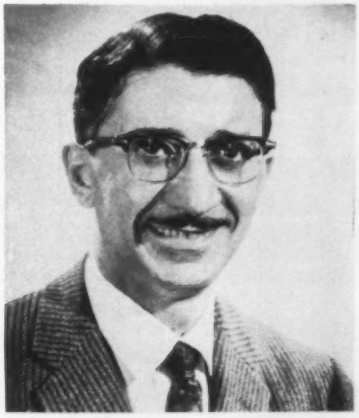
Consolidated General Products, Inc.—**J. W. Morgan,** appointed director, marketing.

M. E. Wood, appointed market development engineer, American Zinc Institute.

W. J. Prochak, named superintendent, rod, wire and conduit dept., Struthers Works, Youngstown Sheet and Tube Co.

Lyon Metal Products, Inc.—**E. E. Jones,** named district manager, Chicago; **Albert Weinberg,** named district manager, Cincinnati; **R. F. Ziegler,** named district manager, Cleveland; **T. V. Loran, Jr.,** named assistant manager, Chicago.

Curtiss-Wright Corp. — **S. R. Shaffer,** named general manager; **L. B. Geithman,** appointed general sales manager, metals processing div., Buffalo.



S. A. Leone, named regional sales manager, The Colson Corp.

Beryllium Corp.—**P. E. Gage,** appointed sales engineer, Reading, Pa.

Reliance Div., Detroit Steel Corp. —**H. R. Smith,** named manager, sales, Grand Rapids.

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For indented, roller method marking or stamping of trade names, trademarks, part numbers on round, flat or contoured parts. Full pneumatic, Hydra-Pneumatic and manually operated models available.

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The Matthews Air-grit takes only a half-second to permanently mark delicate parts or hard to mark surfaces like glass, plastic, steel, carbide or anodized aluminum.

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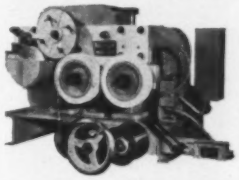

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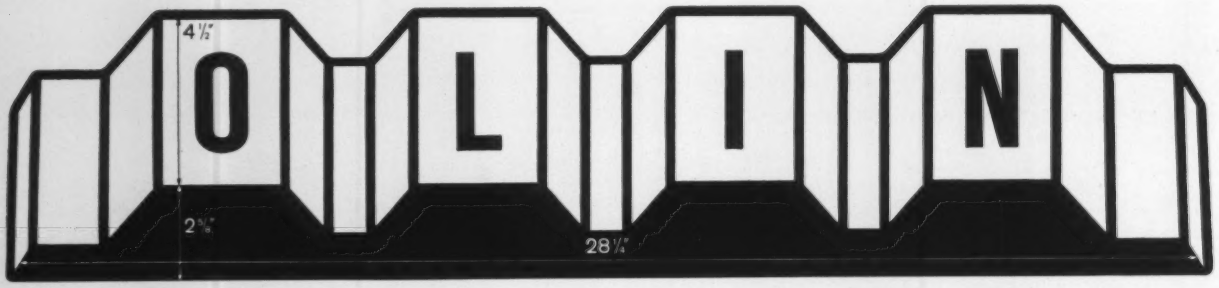
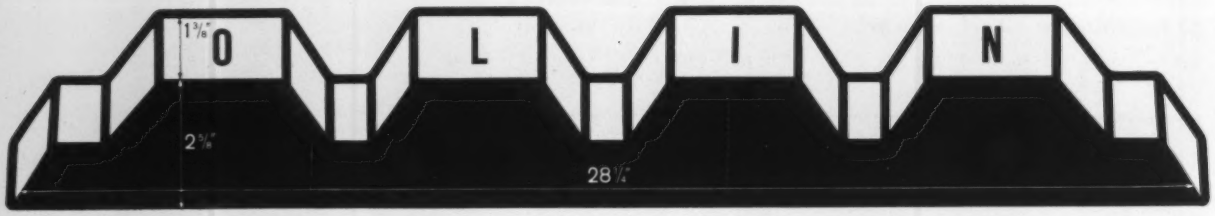


25-lb. ingot



10-lb. ingot

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ANNISTON 1
L. A. Draper Metals, Inc., 330 So. Noble Street. ADams 7-3585

CALIFORNIA

LOS ANGELES 23
McGowan Co., Inc., 1205 So. Boyle Street. ANgeles 3-7575

OAKLAND 20
Globoloy Metals Inc., 1820 Tenth Street. Highgate 4-7249

DELAWARE

WILMINGTON 99
North American Smelting Co., Marine Terminal. OLympia 4-9901

ILLINOIS

AURORA
Wm. F. Jobbins, Inc., P. O. Box 230. TWinoaks 7-8648

CHICAGO HEIGHTS
Benjamin Harris & Co., State and Eleventh Streets. SKyline 5-0573. INterocean 8-9750

MASSACHUSETTS

MIDDLEBORO 1
Bay State Aluminum Co., Inc., P.O. Box 89. Middleboro 1251-W

MICHIGAN

DETROIT 2
Milton A. Meier Co., 7430 Second Avenue. TRinity 5-9371

MINNESOTA

MINNEAPOLIS 7
Harry A. Brown Co., Inc., 2810—22nd Avenue, So. PArkway 2-6664

MISSOURI

KANSAS CITY 26
Altaw Distributing Co., 1601 Crystal Avenue. CHestnut 1-1337

NEW YORK

BROOKLYN 37
Henning Brothers & Smith, Inc., 91 Scott Avenue. HYacinth 7-3470, 1, 2

SYRACUSE 1
Syracuse Metal Distributors, Inc. (Thompson Road Plant), P. O. Box 83. HOward 3-8501

OHIO

CINCINNATI 9
Cincinnati Steel Products Co., 4540 Steel Place. TRinity 1-4444

CLEVELAND 13
Midwest Aluminum Supply Corp., 1978 W. Third Street. PRospect 1-8240

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These Olin Aluminum distributors are known in the industry for their fast, complete service and their wide range of alloys in immediately available stock. What you may not know is the fact that these distributors also offer you a full range of technical service backed by Olin's metallurgical staff and laboratories. This service includes help in metal selection and application advice, tips on casting and finishing aluminum. Why not make Olin Aluminum your source of perfect casting alloys – and the latest metallurgical know-how. Call your local Olin Aluminum distributor and get experienced help on any of your foundry problems.

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When fastenings fail...

it may be your product's reputation that suffers most

When so much literally hangs on a bolted connection—as in this swing—the importance of a single nut becomes dramatically clear: *If the nut lets go, tragedy!*

In a sense the same is equally true of complex and costly products like farm equipment, washing machines, computers—or any other product you make that is subject to vibration when it is operating.

If your customers can't count on critical connections staying tight under punishing field conditions—and, even should the actual damage be slight—if they're faced with failure and expensive downtime because a nut lets go —you've had it when it comes to reorders!

The moral is clear. You simply can't afford to have your product's reputation for reliability ruined by fasteners that can't be relied on.

For more than 20 years, many of America's top manufacturers have relied on Elastic Stop® nuts to protect their product's reputations. They've learned that Elastic Stop nuts with their exclusive nylon locking inserts *simply will not work loose!* Not under the toughest impact, shock or vibration! Never! They stay put to give your product low cost insurance against fastener failure —the kind of insurance you can't afford to be without!

When you remember that reorders are written in your customers' maintenance records, you'll want to see how these leading companies protect the good name of their products with Elastic Stop nuts. Write for our interesting Bulletin No. 5901 Dept. S46-377, Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, New Jersey.

ESNA®

for the ring **O** *of reliability*

ELASTIC STOP NUT CORPORATION OF AMERICA

Private Satellites by 1962?

NASA officials point out to private industry that international space-communications systems may become a multi-million-dollar business in the next few decades. The program will get its biggest boost in the next two or three years. In this period, NASA plans to launch eleven communications satellites. By mid-1962, NASA is expected to launch satellites for industry.

'Copter for Business Travel

Prospects for the helicopter business are good, indicates L. W. Pogue, counsel to the Helicopter Council. Much of the resistance to helicopters, due to their newness and strangeness is being overcome, he points out. While there is still a problem in zoning for heliport locations, there is a "marked improvement" in the acceptance of the 'copter for business and production.

New Air Force Command

The Air Force is centralizing its ballistic-missile program under a new command. The new command, to be known as the Air Force Systems Command, will have four divisions: Ballistic Systems, Space Systems, Aeronautical Systems and Electronic Systems. Contract management will be covered at a later date.

Land on Titanium Wheels

A new rustproof aircraft wheel withstands more than 1000°F. Made mostly of titanium, the wheel was developed to meet the severe operating needs of high-speed aircraft. Titanium's high strength:weight ratio makes for thinline wheel design—leaving more room for brakes. Impact strength is high and because the metal's conductivity is low, tires stay cool while braking.

Machining Studies Pay Off

Methods studies on cutting refractory metals and other high-temperature materials are paying off in practical data for aerospace plants and suppliers. Localized heating with plasma-jet flame, direct plasma-jet cutting and ultrahigh speed machining above 150,000 fpm are also being studied. Work on better cutting tools and cooling methods is also promising. Technology will benefit all metalworking.

Stronger Graphite Cloth

Continuing R & D on graphite cloth has tripled the strength and doubled the flexibility. The increase in strength is expected to point the way to still more military and industrial applications for graphite textiles, according to W. G. Pitt of National Carbon Co. The cloth has already been tested for use in rocket engines.

Solid Fuels Stepup?

President Kennedy must decide whether to ask Congress for $30 million to step up work on space boosters powered by solid fuels. He has been told that solid fuels could "leapfrog the U. S. into a clear-cut lead over the Russians in big boosters." Experts also say that the allocation to the solid-fuel program could "very possibly produce within three years a booster with more than 20-million lb of thrust."

Flat Cable Slims Missile

Marking another step in miniaturization is a new flat and flexible cable. It's paper thin and can carry up to 40 separate conductors. Weighing much less than round wiring, contour cable can replace the complex and cumbersome wiring inside missiles and rockets. Made by Hughes Aircraft, the cable consists of flat metallic strips embedded in a plastic dielectric ribbon.

Automated Count-Down

Reliability, in automatic missile-checking systems, is rapidly growing to meet demands. Advantages are speed of checkout, elimination of human judgment and error, and minimizing of skills and training needed to make the last minute flight checks. These tape-controlled units, generally capable of self evaluation, may even gain acceptance in other areas of production.

Another ⋈ Test System at work...

Magnatest eddy current unit, in which magnetic continuous weld pipe is tested for serious defects as it passes through sensing coils. Fully mechanized handling and automatic marking also provided by Magnaflux Corporation.

New Selective Eddy Current Test for Continuous Weld Pipe

This particular Magnatest SD-100 is one of a series of new Magnaflux-developed inspection systems for testing continuous butt-weld pipe and electric weld tubing. It precisely locates and marks the defects you want to find—at speeds to 600 feet per minute or more, on diameters up to 4".

The SD-100 is selective. It can be used to find varying degrees of gross defects. It will locate ring welds, caves, dents, scabs, saw cuts, slivers, burned welds, cold worked areas. Your needs are the determining factor . . . and with automatic marking and mechanized handling, available from Magnaflux, the per shift testing rates are determined mainly by your particular requirements.

Whether you test continuous butt-weld pipe or almost any other magnetic pipe, rod or wire, find out how one of the many ⋈ Test Systems can help you standardize quality and cut costs—per foot, per day or per 100 miles! Phone our local Magnaflux Field Engineer, or write Magnaflux Corporation, 7302 W. Lawrence Avenue, Chicago 31, Illinois.

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A SUBSIDIARY OF GENERAL MILLS
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TEST SYSTEMS

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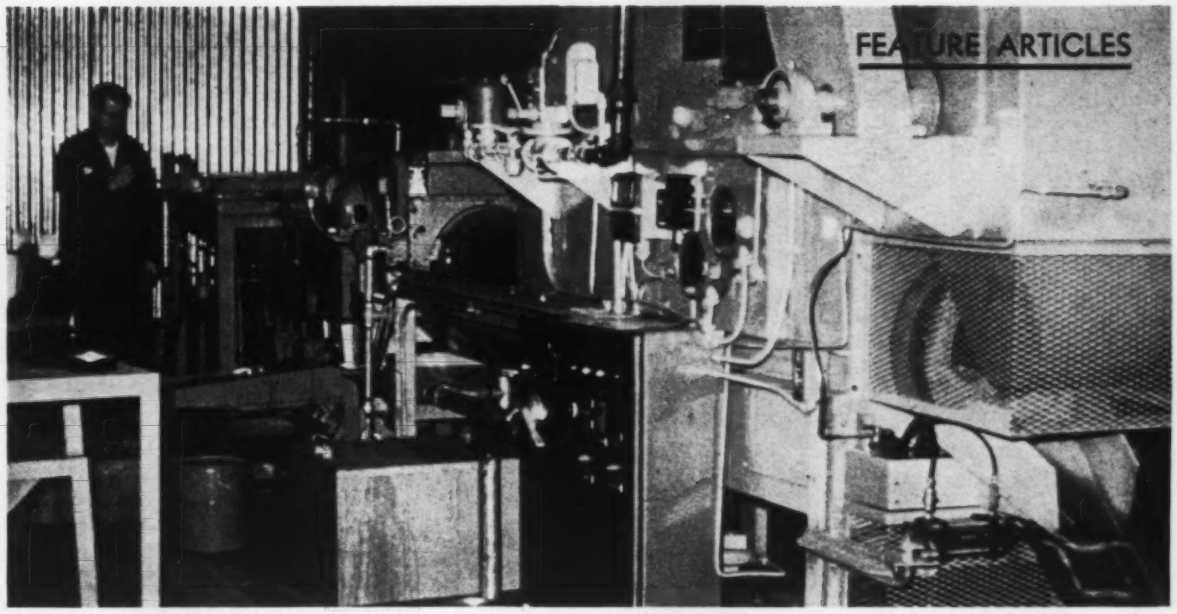


AUTOMATED SETUP: After tumbling, automatic equipment washes and dries the mechanically-plated parts.

Mechanical Plating: A Solution To Hydrogen Embrittlement?

It's hard to prevent embrittlement in applying thickly-plated protective coatings.

But there's a way around this bottleneck. The solution centers on low-cost mechanical plating in a wet tumbler.

■ A new approach to metal plating centers on a mechanical-plating system, recently introduced by the Minnesota Mining and Mfg. Co., St. Paul. This system is based on a process developed by The Tainton Co., Baltimore. General improvements were made by 3M's engineers.

Mechanical plating offers an economical means of obtaining thick zinc or cadmium coatings. Potential uses cover a wide range of odd-shaped parts.

One place where the new system already serves is in the industrial-fasteners industry. An illustration shows a few of the complex fasteners which have been successfully plated by using this new system.

No Hydrogen Embrittlement—Two factors prove particularly important in plating this type of product. First, the system doesn't embrittle carbon-steel parts. This means that heat-treated spring-steel fasteners can be plated without damage. After they're plated, follow-up baking isn't required.

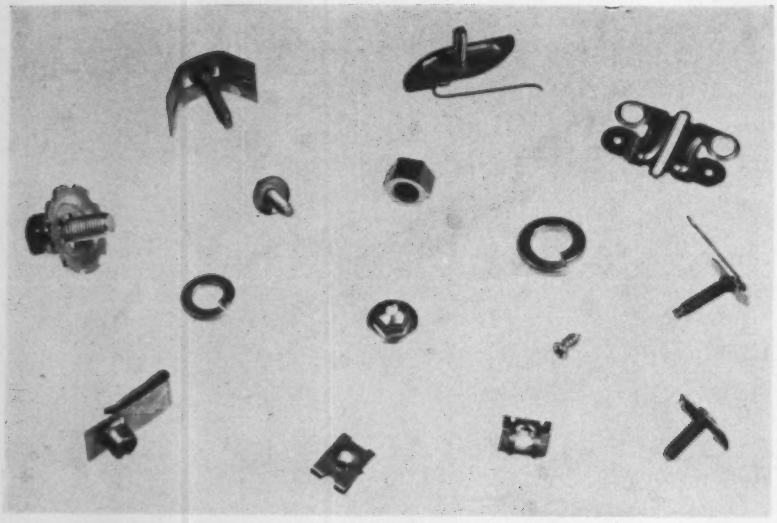
The second plus factor revolves around costs. Thick protective coatings can now be applied. These coatings meet today's ever-increasing corrosion-resistant requirements. And they don't incur premium expenses.

How does mechanical plating work? It differs from other plating methods in that the plating material is supplied as small metal-powder particles.

Metallic Bonds—During the plating operation, these metal particles

Note the Advantages Of Impact Plating

- No Hydrogen Embrittlement
- Uniform Plating Thickness
- No Discoloration of Parts
- Follow-up Aging Isn't Needed
- Parts Are Ready for Immediate Service

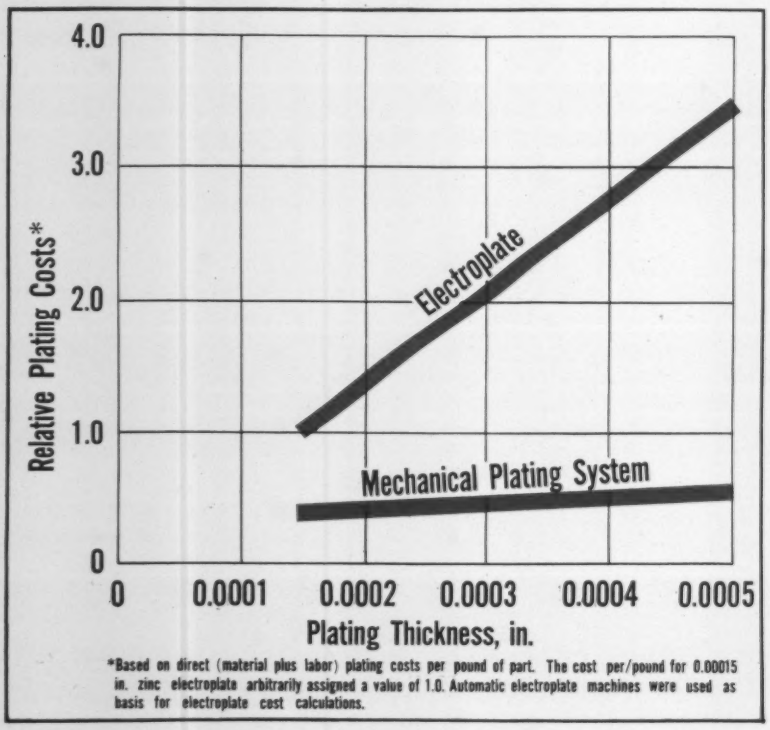


EASILY PLATED: Complex fasteners are easily plated by using the new system. Plating material is supplied as small metal-powder particles.

transfer to each part's exposed surfaces. They are cold welded onto the exposed surfaces to yield a dense, uniform coating. Thus, true metallic bonds are formed.

At present, most commercial applications hinge on zinc plating. However, cadmium and certain other metals can also be plated on odd-shaped parts. Current fastener uses include helical spring-lock washers, hose clamps, flat washers, stamped speed nuts and standard nuts, bolts and screw assemblies.

How Plating Costs Compare



*Based on direct (material plus labor) plating costs per pound of part. The cost per/pound for 0.00015 in. zinc electroplate arbitrarily assigned a value of 1.0. Automatic electroplate machines were used as basis for electroplate cost calculations.

To check out a typical mechanical-plating operation, let's consider a case in point. Finish specs for certain industrial fasteners call for 300 hours of exposure to salt spray before rust appears. This means these plated fasteners have to withstand a 5 pct salt-spray test per ASTM Spec B 117-57T.

Optimum Protection—By applying a 0.0005-in. zinc plating to each fastener, plus a subsequent dichromate treatment, the fastener maker obtains protective coverings that meet this tough salt-spray requirement.

Here's how he does the job. A 200-lb batch of spring-steel fasteneners, having a bulk density of 40 lb per cu ft is made from 0.026-in. thick steel. All these fasteners must be plated to 0.0005-in. coating thickness.

The weight of the parts and the gage of the steel from which they're made permit calculation of their surface areas. This information, together with the thickness of plating desired, pinpoints the amount of zinc needed to plate the 200-lb batch.

Good Coverage—Graphs speed these calculations. These graphs take into account the fact that metal deposition is better than 90 pct efficient. Using such a graph, you find that only 8 lb of zinc powder is needed to plate the 200-lb batch of fasteners.

To plate these parts, they must first be cleaned, descaled and primed. Chemical-dip tanks handle this initial-preparation work. After preparation, the fastener maker places the parts in a rubber-lined tumbling barrel.

He charges the barrel with an impact media. The impactors consist of fixed sizes and shapes of glass particles. During tumbling, these glass beads repeatedly strike the parts in the barrel. In essence, they act as hammers to pound the zinc powder onto the fastener surfaces. This is how cold welding takes place.

Add Tap Water—After the fast-

eners and impactors are placed in the barrel, the 8-lb charge of zinc powder is added along with ordinary tap water. The water should cover the mixed charge by about 1-3 in. Water temperature must be 60°-70°F.

Promoter chemicals, in bar form, are added to the barrel. Use one bar for each 50 lb of parts being plated. Thus, the 200-lb charge of fasteners requires 4 bars.

After charging the barrel, close the lid and rotate the barrel for about 45 minutes. In general, the larger the barrel's diameter the slower the rotation speed. An 18-in. diam barrel should be rotated at 24 rpm. For a 24-in. diam barrel, use 18 rpm. If your barrel is 36 in. in diameter, reduce the rotation speed to 12 rpm.

Thick or Thin?—Different part types may call for some deviation from the listed barrel-rotation speeds. Generally speaking, low speeds tend to increase coating thicknesses on exposed edges. High speeds, on the other hand, give a higher polish.

After the plating cycle is completed, the contents of the plating barrel are discharged to hoist pans. The spent promoter chemical can be safely and economically discharged into a sewer.

Next, the glass impactors and the plated parts are washed. Separate the impactors from the parts and return them as a batch for the next plating run.

Cost Factors—At this point, the fasteners are ready for dichromate treatment and drying. Automated equipment is available to wash, separate, dichromate and dry the plated parts.

Mechanical plating's biggest asset centers on heavy coatings. With the new system, it's economically practical to obtain the corrosion protection of 0.0003-0.0005 in. of zinc or other metals. Plating costs are relatively insensitive to plating thickness.

The difference in cost between a 0.0003-in. zinc coating and a coating that's 0.0005 in. in thickness is almost nil. The only cost differential is the small cost of the extra zinc. Process-cycle time and the amount of chemical needed remain exactly the same.

Plated Parts Boast Long Life

Part Type	Zinc Coating Thickness, in.	Dichromate Treatment	Hours to Red Rust*
Molding Clip	0.0005	Iridescent	450
Lock Washer	0.0005	None	100
Lock Washer	0.0005	Clear	300
Lock Washer	0.0005	Iridescent	550
J-Nut	0.0004	None	72
J-Nut	0.0005	Iridescent	380
Bolt-Washer Assembly	0.0003	Clear	115

*In 5 pct Salt-Spray Test; ASTM B 117-57T

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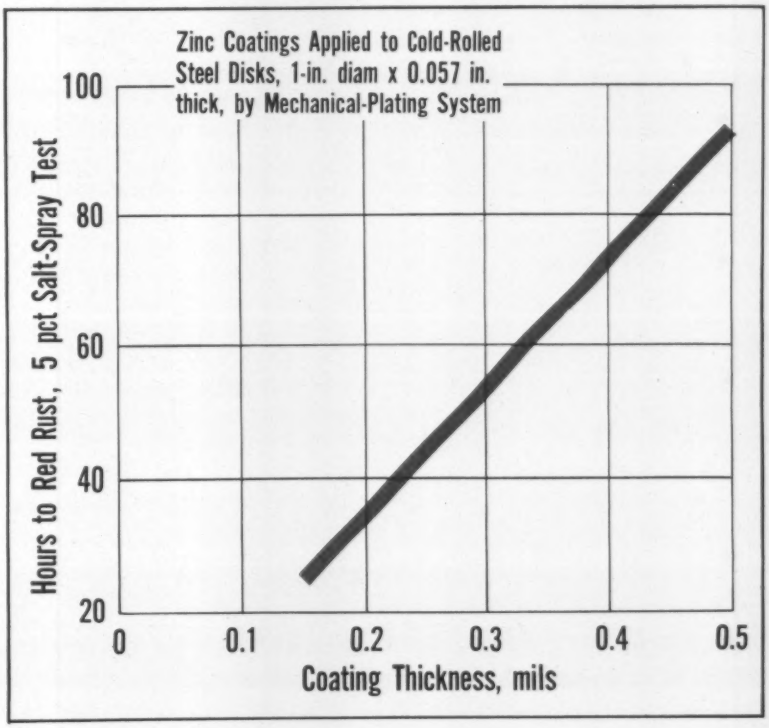


EASY FABRICATION: Computer-calculated plates fall neatly into place for submerged-arc welding.

Computer Solves Layout Problem

Laying out plates to make up a rotating, tapering span can be a real puzzler.

One fabricating group gave the job to a computer.

■ A computer played a vital role in the central "theme structure" at a new Los Angeles airport.

Without it, erection of the parabolic steel arches—a key feature in the structure—would have been a tedious and costly task. These arches span an observation deck. An arch span is 131.5 ft above grades; the span is 355 ft long.

What's the Problem?—How to fabricate these arches was the puzzler. It was the job of the Fabricating Div., Kaiser Steel Corp., to solve it.

The problem is that the square span is rotated 45° along its length. Thus, the skin plates forming this span look as if they were warped. Moreover, the lower arch section tapers.

It's obvious, then, that the calculated dimensions of the skin plates, the angle plates which join them internally, and the stiffeners must be exact.

Ease Assembly—With these data, contoured plates could then be easily assembled. V-jigs would form the arch sections accurately and hold them during welding. And cost of fabrication would be held to a minimum.

The calculating job was given to a Burroughs 205 computer. All that was required was to feed it the equation, $Y = 131.5\text{-}0.0046871X^2$, which mathematically describes the arch, according to J. V. Banks, assistant general manager of the Montebello, Calif., division.

Integrating the curve gave the numerical values for Y and Z for each inch of X.

With the space coordinates thus developed for the corners of skin rectangles represented by a one-in. slice. In the Y-Z plane, the included angles and lengths of sides were known. The plane geometric dimensions of these one-in. slices, accumulated, produced the skin-plate.

Helps Detailer — Rotating the axes so that the X axis became a chord was the next step. Thus, values would be offset from the chord to the trim line. Result: data is readily usable by the detailer.

All of the above computations were programmed into the machine before the runs were made. Results were automatically converted to the nearest 1/16 in. From these data, the detailers selected those needed to describe the layout for shop use.

Pointing up the success of this technique was the ease with which all cut plates fitted into the jig. No subsequent trimming was needed. Automatic submerged-arc welding of the plates could then proceed.

Fluid Mold Aids Forging Finish

New Process Uses Molten Slag To Seal Mold Wall

Flaws on an ingot's surface can nucleate seams and laps later if it's forged.

One company hit the root of the problem by lining the mold with a liquid slag.

■ One-heat orders for large steel forgings are now being filled on a "make it right the first time" basis, without the uncertainties in ingot surface quality, chemistry, and forgeability that sometime prevails.

The feat is accomplished in the Torrance, Calif., plant of the National Supply Div. of Armco Steel Corp. by using a new process called Fluid Mold Casting. This process is also backed up with a new technique. Superior surface properties, even in badly fire-checked molds, are possible with this molding technique.

Materials such as high-temperature alloys, and ingots of stainless and tool steels weighing more than 50,000 lb, are produced for forgings. Forgeability improves with elimination of excessive conditioning or reheating of the ingot.

Special Slag — The Fluid Mold Casting process is characterized primarily by use of a special slag in the ingot mold. This slag is melted and introduced into the bottom of the mold.

As the metal rises in the mold, the floating molten slag coats the mold wall with a thin skin. Pits or cavities in the mold wall are thus filled with the molten slag, producing a smooth, continuous envelope to contain the molten metal.

The FMC slag, supplied in about 1-in. pieces, melts within a fairly narrow range near 2200°F. Its viscosity approaches a minimum at about 2300°F. A slag density of just over 2.5 permits good separation in the ingot's body.

A Few Variables — The technique in the melt shop varies with the equipment, ingot size, and analysis of metal. National Supply's conventional three-ton direct-arc melting furnace melts the FMC slag.

The bottom of the furnace and the tapping spout are made of a graphite ramming mix because of the rapid solution rates of the usual refractories in the slag. A graphite tee starts the heating since the slag, itself is a nonconductor when cold.

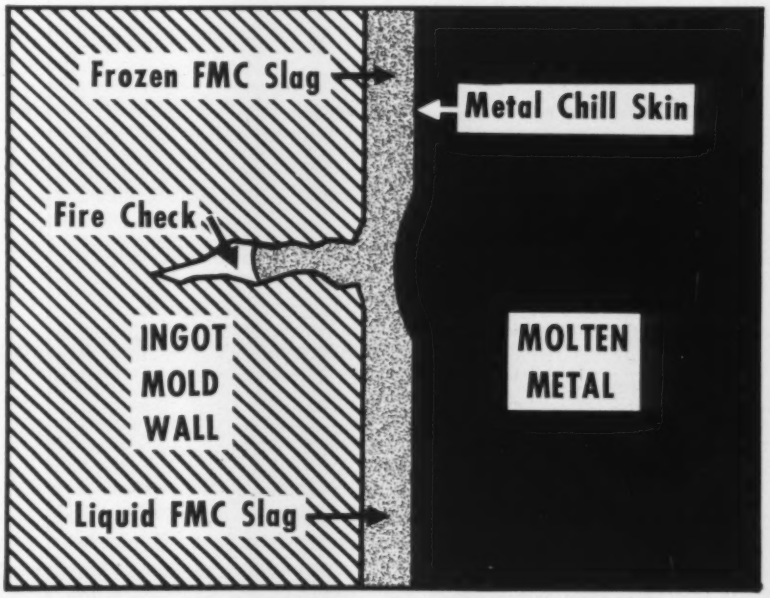
After a pool is formed in the delta zone, the graphite tee is removed, the electrodes are immersed, and melting is continued. The submerged arc prevents excessive effluent and a possible change in chemical balance.

The molten slag is heated to 3200°F, tapped into a transfer ladle, and taken to the pouring pit. It is then poured into a mold in a quantity of 50 lb per ton of gross ingot weight and the steel is teemed immediately.

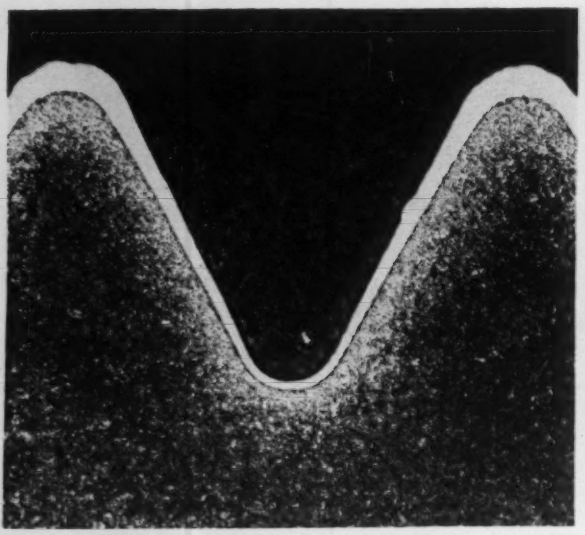
Clean Surface—Stripping refractory type inclusions from the metal while pouring was first seen on a two-ingot heat of 12-pct chromium steel.

Microscopic examination proved that high melting point chromium-base inclusions are stripped from the FMC ingot while lower melting inclusions remained untouched. This technique has been developed and is now used on UHS grades for missile applications where extreme cleanliness is required.

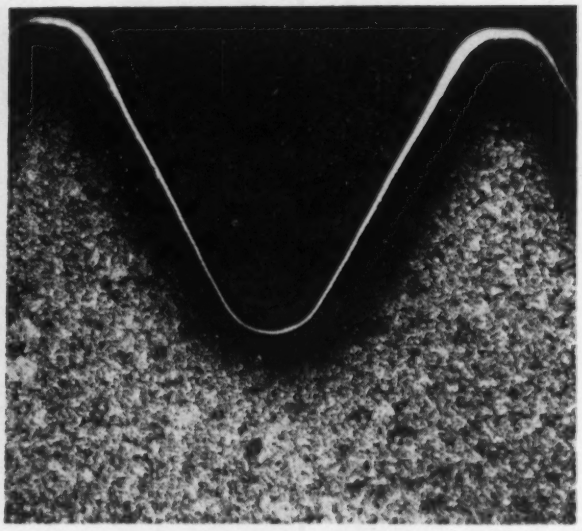
The FMC technique, when included with good melting practice, gives excellent ingot surfaces, low refractory inclusion counts, increased ingot mold life, and low ingot-to-billet conditioning costs.



IMPROVES FINISH: Imperfections in the ingot mold wall are filled with molten slag, thus producing a smooth skin to meet the molten metal.



LIGHT BAND: The decarburized band along bolt thread profile is layer of weak strength.



DARK BAND: The carburized band can be another source of trouble—hydrogen embrittlement.

Hidden Causes of Bolt Failure: "Carb" and "Decarb"

Detection of "carb" and "decarb" is vital to bolt manufacture.

One lab finds that exposing these culprits often takes more than a microexamination.

■ Control of carbon content is an important phase in steel product manufacturing. For high-strength bolts, it's particularly important. Results can be disastrous if carburization and decarburization escape unnoticed.

The problem has been given much attention by bolt manufacturers. Standard Pressed Steel, Jenkintown, Pa., for example, has made an intensive study into the causes, effects and measurement of "carb" and "decarb."

Weakens Steel — Because the strength of a steel is tied up with the carbon content, "decarb," the loss of surface carbon, gives a weaker steel. A steel bolt, for example, can lose as much as 30-50 pct of its surface strength.

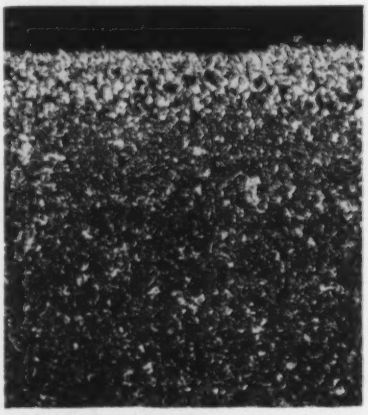
Another very serious effect of "decarb" is the lowering of fatigue life. A loss of as little as 0.1 pct surface carbon may reduce the fatigue life to one-third its original value.

Moreover, a decarburized surface is softer and more easily damaged in handling. And surface marks and notches can contribute to fatigue failure.

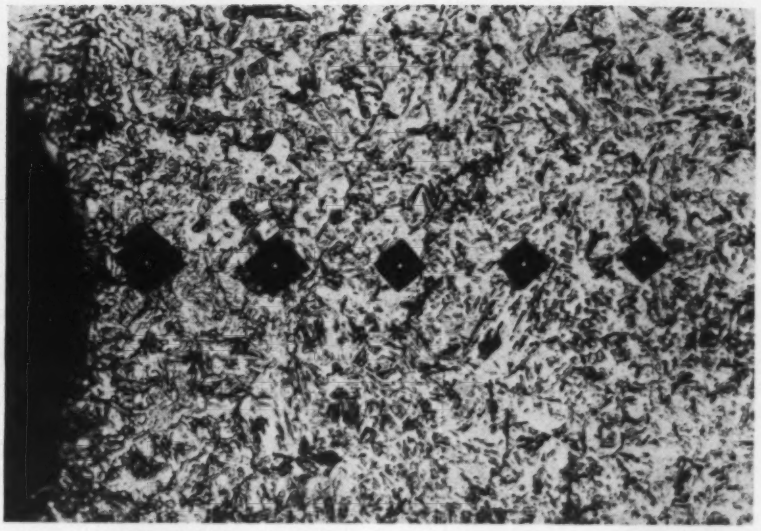
What Causes It?—Since "decarb" can occur any time steel is heated in a carbon-poor atmosphere to a high temperature, the problem can be traced to a number of manufacturing processes.

Annealing of bar stock in a low-carbon atmosphere can create "decarb." The bolt manufacturer also depletes the surface of carbon if the proper atmosphere is not maintained during heat treatment of the finished bolt.

Very often, bolt manufacturers attempt to restore the carbon by heating in a high-carbon atmosphere. But, in almost all cases, reports Standard Pressed Steel, a narrow subsurface soft band remains to plague the user with premature failures. Now, let's check out another very vexing problem.



BOLT SURFACE: "Decarb" is often cause of early bolt failure.



SOFT SURFACE: Though visual inspection reveals no "decarb," the large microhardness indentation shows there's a soft layer at the surface.

Subsurface Cracking — There's another factor. Carburization gives rise to compressive stresses on the surface during heat treatment. Just below the surface, there are tensile stresses. At the interface of these two stress layers, it's possible to have subsurface cracking.

This does not mean, explains A. C. Hood, supervisor, SPS testing labs, that carburization for parts involving high wear is not recommended. "It's in bolts that carburization is detrimental because of designed notches which occur in the head-to-shank fillet and the thread roots."

Embrittlement Occurs—Carburization creates another serious problem in bolts—that of hydrogen embrittlement. "It's been found," says Mr. Hood, "that as the bolt strength increases, so does the tendency for hydrogen embrittlement."

Other effects of carburization include lower fatigue life and inability to withstand bending stresses.

Carburization can occur if parts are dirty or oily when placed in a heat-treat furnace. The dirt and oil break down to form carbonaceous products. Result: More carbon in the steel surface.

Permitting a high-carbon atmosphere to come in contact with the work also results in carburization. The effect upon the finished bolt is worse than when "decarb" is present.

What's the Cure? — What's the best way to handle "carb" or "decarb"? According to Standard Pressed Steel, the best cure for these conditions in high-strength bolts is to machine or cut away the entire carbon-depleted or carbon-enriched surface.

How can the amount of "carb" or "decarb" be determined? The company offers this procedure.

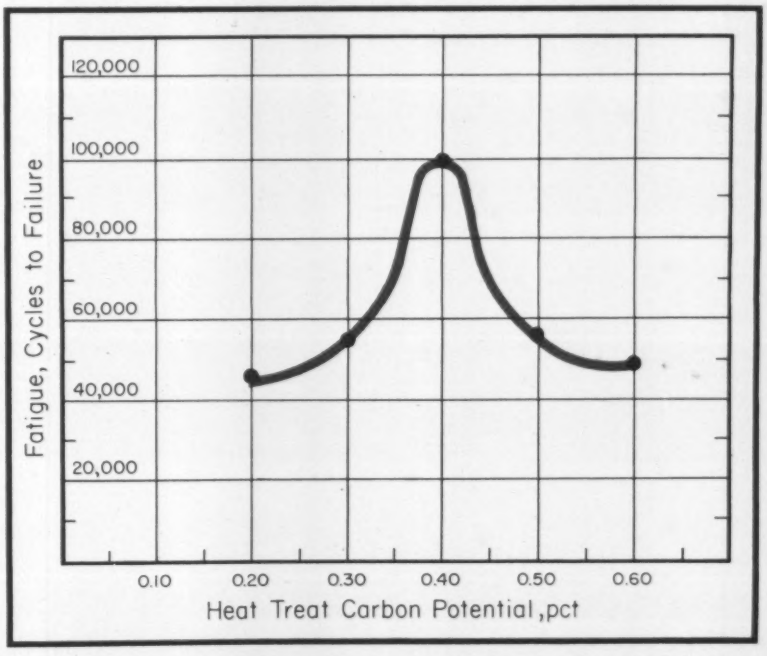
The first step is to cut a section from the bolt. After polishing, the specimen is treated with a 4-pct nital etch.

Color is Clue—Carburization, if present, will stand out as a dark band on the surface. Decarburization will appear as a light-colored band.

This microexamination may not be enough, says Mr. Hood. A reference method is to check the cross-section with a microhardness tester. Recommended load is 200 g with a diamond pyramid indenter.

If the surface hardness varies from that of the average core hardness by more than 25 Vhn (about 2 Rc), carburization or decarburization is considered to exist.

Fatigue Life Hinges on Carbon



FALLS OFF: For screws, a carbon potential above and below the carbon content of the base material will cause a dip in fatigue life.

New Mill Hikes Bar Production

Steel-bar capacity takes a leap upward with a newly installed 17-strand mill.

Modern equipment moves bars down the line at 2600 fpm.

■ To keep in step with the construction trade's demands for reinforcing bars, Bethlehem Steel Co.'s Steelton, Pa., plant has just raised its annual capacity to 350,000 tons. The bars find their major use in reinforced concrete.

The capacity hike results from the company's new mill. Under construction for over a year, the mill's operations are housed in three buildings. One contains the heating furnaces and mill proper. Building two, arranged crosswise to the mill, holds the shear and shipping facilities. The third is the cooling bed —the end of the line for the finished bars as they leave the mill proper.

Up to Date—The new continuous-type, double-stranded mill has 17 stands, and two repeaters. The layout of the mill permits the future addition of finishing stands and coilers for the production of rods as well as reinforcing bars.

Production of re-bars in this fully-automatic mill is fast, high in quality and versatile. The mill produces, for example, about a mile of ⅜-in. diam re-bars from one 4 x 4-in. by 40-ft long billet. The bar moves to the cooling beds at a rate of 2600 fpm.

Double stranding permits the manufacture of over 5200 60-ft lengths of ⅜ in. (No. 3) bars per hour. A 5-ton bundle can be shipped every 10½ minutes. Larger bars can be bundled and shipped even faster.

High Quality — The mill's instant-acting electronic devices leave little chance for error. Only new open-hearth billet steel is fed into the mill.

Changeover from any one bar size to another requires only to add or subtract a roughing and finishing stand. Special cut-offs permit production of small amounts of special sizes without interrupting big runs.

From raw billet to finished product, the steel moves through the new mill "untouched by human hands." Steel pipe posts in the storage area separate billets into sections according to various heats and grades.

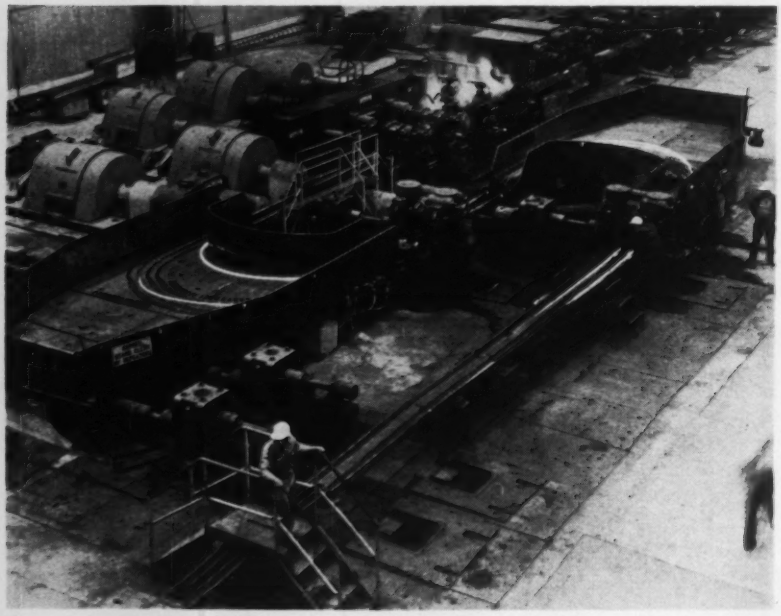
When deemed acceptable for use, a billet is shoved into the furnace's heating zone—then into the soak zone. Temperature in the heating zone is about 2150°F; in the soak zone, 2270°F.

Ready to Roll—When double stranding smaller rod diameters, two billets hit the stands at the same time. The push-out man feeds hot billets upon word from the operator at the cooling beds who checks to see if the line is clear.

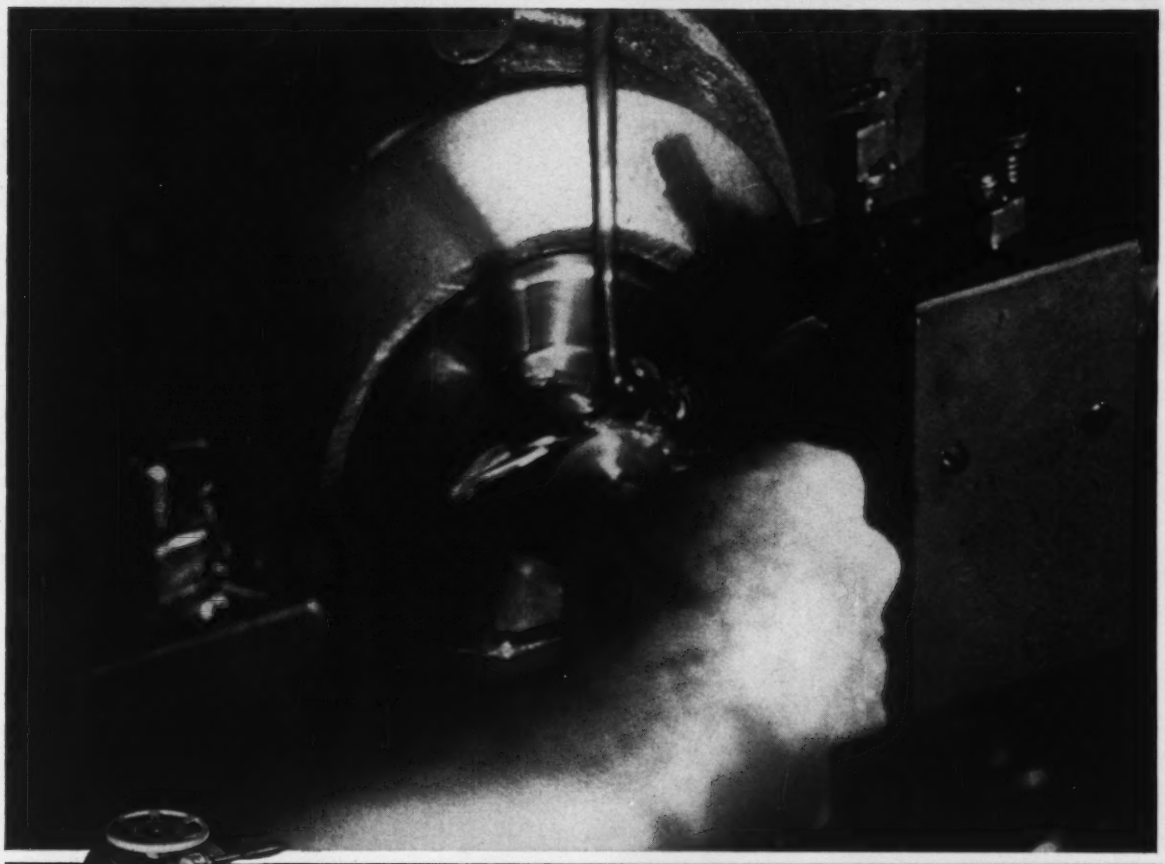
The 4 x 4-in. billet emerges from the roughing mill either as a 1-in. square or a 2-in. square, depending upon which bar size is being formed. Next, the "cold" front end is sheared from the bar. Should there be a foul up on this high-speed line, the shears can also quickly cut the product to scrap pan sizes and readily get it out of the line.

Once cropped, the bar passes through a 4-stand intermediate mill, and emerges as either a 9/16-in. square or a 1¾-in. round—then, through four more stands to obtain its ⅜-in. finished diameter. Larger diameters, naturally, would be pointed toward other stands to gain their finished size.

The bars will be used in a wide variety of construction projects, such as schools, highways, homes, apartment houses, factory buildings, dams, and bridges.



ON THE WAY: Billets from the mill's roughing stands travel through intermediate and looping stands, then to finishing stands. The looping stand's steel pans allow the bar to flex and flare out.



COOL CUTS

Keeping close tolerances is of prime importance at Diagraph-Bradley Industries, Inc., of Herrin, Illinois, leading manufacturer of stencil machines and accessories. One of the ways this is accomplished is by keeping cutting edges cool.

At Diagraph-Bradley stencil punches must be cut and held within .0005 of an inch—a fine point of precision Diagraph-Bradley attributes to the cooling and lubricating effect of Cities Service Chillo 10 cutting oil.

"You have only to take a Diagraph-Bradley machine," says one of the company officials, "cut a stencil with it and look at the resulting letter to realize how important the right cutting oil is to our production."

Cities Service Chillo 10 oil is a sulphochlorinated oil. The concentrations of sulphur and chlorine are stabilized by a special process, assuring uniformity of action through the entire cutting operation.

That's why, with Cities Service Chillo 10 cutting oil, work is always more accurate, clean and cool!

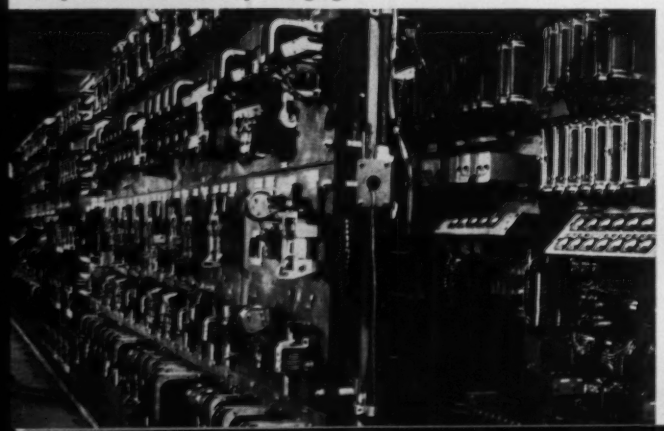
For full information call your nearest Cities Service office or write Cities Service Oil Company, Sixty Wall Tower, N.Y. 5, N.Y.

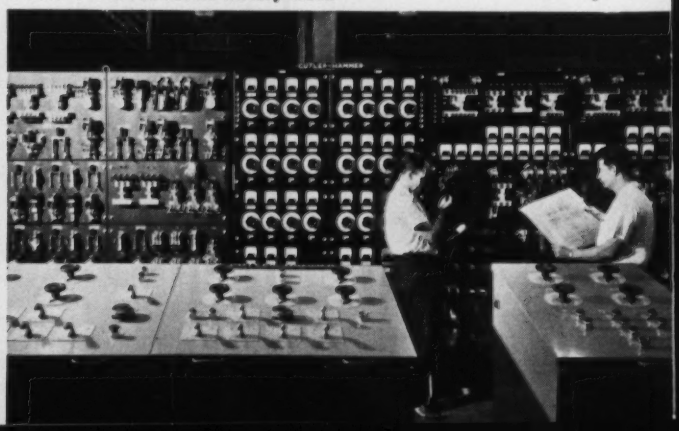
CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Cutler-Hammer Control. Shown here, the control of 87 D.C. motors, employing 16 static regulators. Kaiser annealing line control system also regulates 45 A.C. auxiliary motors; requires 10 operators' stations and more than 300 meters, pushbuttons, master switches, potentiometers and operating lights.

Cutler-Hammer Test Floor. Here, complete factory tests of systems control prior to shipment insure faster installation, more trouble-free start-ups. Analog computer-simulator can test engineering solutions before construction; simulate response of any motor or machine to aid in actual factory tests.





What's new in systems control?

Cutler-Hammer Control commands 1600 h.p. High Speed Annealing line at Kaiser Fontana

Big D-c system meets demanding requirements on 1200-FPM line

The responsibility for making the block-long system of huge equipment in a modern annealing line function continuously and in perfect step falls on control engineering. For this responsibility, including all control and rotating equipment, Kaiser selected Cutler-Hammer in the recent expansion of its Fontana works.

The problem: a continuous flow of steel strip through entry, furnace and recoil sections . . . through looping towers on each side of the furnace . . . at 1200 to 1500 FPM!

Laboratory testing speeds trouble-free start-up

Each step posed a critical control problem. Yet Cutler-Hammer's systems and control engineers bound the whole into a smoothly operating team. The entire system was pre-tested in Cutler-Hammer laboratories. Result: Kaiser-Fontana reaped the benefits of a more complete test, quicker installation, and a faster, more trouble-free start-up. Kaiser today produces the uniform quality tinplate demanded by its customers.

Cutler-Hammer control systems and equipment were installed on seven of the first nine high-speed annealing lines built. Cutler-Hammer engineering and equipment is also at work on the Fontana pickling line, coil preparation line, and in auxiliaries for slabbing, hot strip and temper mills.

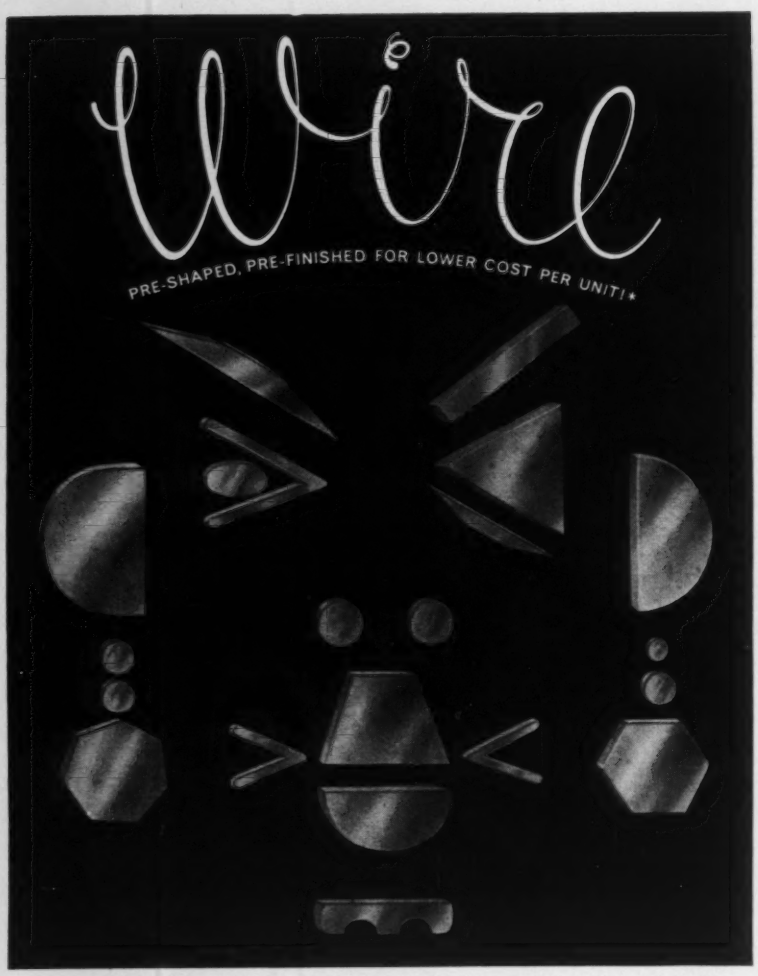
Call the C-H man . . . early!

Cutler-Hammer's broad experience in all phases of systems control design means the Cutler-Hammer man brings a knowledgeable eye to your particular control problem. Cutler-Hammer procedures insure a complete pre-test of your system. Assure you a quicker installation and a faster, trouble-free start-up. Call your nearby Cutler-Hammer office early.

WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.



*Examples shown are greatly enlarged cross-sectional views of selected standard and special shapes available

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NEW PATENTS

Maintains Correct Feed

Mechanism and method for regulating feed of material, T. R. Schuerger and F. Slamar (assigned to U. S. Steel Corp.), Dec. 20, 1960. Improved apparatus automatically maintains the predetermined proportions of ingredients, such as ore, ore fines, coke, and other additives, being fed to an iron ore sintering apparatus. No. 2,965,265.

Metal Oxide Reduction

Reduction of metal oxides, H. B. Sargent and R. M. Poorman (assigned to Union Carbide Corp.), Dec. 6, 1960. In a method of reducing metal oxide, e. g. iron oxide, powders, the powder is mixed with propane or the like and ignited in a detonating chamber. A fine metal powder product is formed. Canadian No. 610,221.

Steel Manufacture

Method and apparatus for steel manufacture, W. Wojcik and B. Schumacher (assigned to Dominion Foundries & Steel Ltd.), Dec. 6, 1960. An electron beam method continually evaluates the average flame temperature in a steel making process, particularly in an oxygen L. D. steel furnace. Canadian No. 610,018.

Cast Iron Method

Manufacture of cast iron, J. M. Crockett and P. M. Hulme (assigned to Air Reduction Co., Inc.), Dec. 6, 1960. An improved commercial method for chemically treating molten gray cast iron with inexpensive upgrading or nodulizing additions of calcium carbide, produces an iron product containing free carbon in nodular, spheroidal or compacted flake form. A minor amount of chromium or rare earth oxides may be injected with the calcium carbide. No. 2,963,364.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

8 NEW VOSS LEVELERS AT U. S. STEEL!

HERE'S THE RUN-DOWN:

VOSS VERSATILITY DEMONSTRATED IN LEVELER APPLICATIONS AT U. S. STEEL

The United States Steel Corporation has been using Voss Levelers for many years. During the past 2 years, U. S. Steel has again shown its confidence in Voss by ordering *eight new levelers* for installation in various plants. The applications are varied, ranging from galvanized and cold-rolled to plate and high-yield missile stock. Exclusive patented Voss principles enable *all* users to get better than stretcher-level flatness under most conditions, and at high production speeds . . . results unobtainable with any other leveler.

Voss Inverted Roller Levelers are designed for ferrous and non-ferrous metals in a wide variety of applications. Let Voss put 30 years of leveling experience to work for you.

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Application: Tin Plate Installed: 1958

IRVIN WORKS
Application: Cold-rolled Shear Line Installed: 1959
Application: High-Speed Galvanizing Line Installed: 1960

VANDERGRIFT WORKS
Application: High-yield Missile & Stainless Steels
Min: .062 Max: .1875 Installed: 1960

ON ORDER:

GARY SHEET AND TIN MILL
Application: Hot and Cold-rolled Steel Plate
Min: .062 Max: .250, 75" width Installation: Late 1960

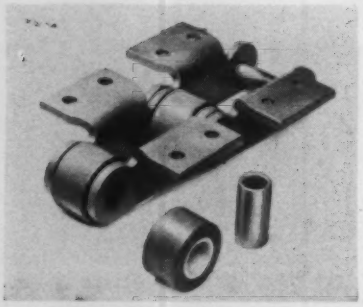
IRVIN WORKS
Application: Cold-rolled Shear Line Installation: Late 1960

COLUMBIA-GENEVA DIVISION
Application: Cold-rolled Shear Line Installation: Early 1961
Application: High-Speed Galvanizing Line Installation: 1961

Voss ENGINEERING CO.

7301 Penn Ave. Pittsburgh 8, Pa. Churchill 2-4422

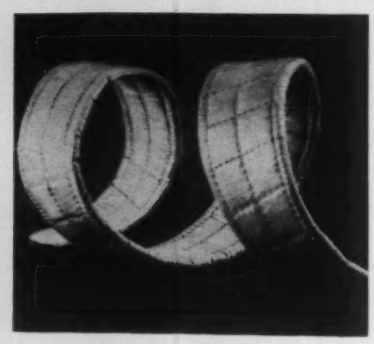
New Materials and Components



Plastic Bushings in Rollers Reduce Friction

After two years of in-service testing, new rollers are available on a complete line of all-steel conveyor chains. They feature Delrin plastic bushings. These bushings resist moisture and retain their strength and size when wet. They resist corrosion better than stainless steel. Coefficient of friction is low. All this adds up to long, trouble-free service life. Other advantages? The rollers need little or no lubrication and they operate at a whisper. Water cleans them, at temperatures up to 180° F. Or, they can be steam cleaned when necessary. (Chain Belt Co.)

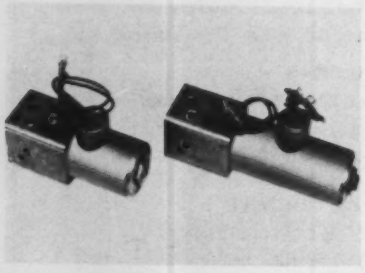
For more data circle No. 22 on postcard, p. 135



Super Insulation Conducts Less Heat Than Air

The thermal conductivity of a new flexible insulation is less than the molecular conductivity of still air, long considered the lowest possible. It cuts the cost and time of prototype development and construction. Both the Government and contractors actively seek these reductions. The insulation comes in blanket or tape form, stitched between two faces of glass cloth. It's suitable for bonding, for service coatings or for laminated systems. It resists vibration. The blankets easily wrap around cylinders, cones or more-involved shapes. In tape form, it's good for spiral winding on pipe or duct. (Johns-Mansville Corp.)

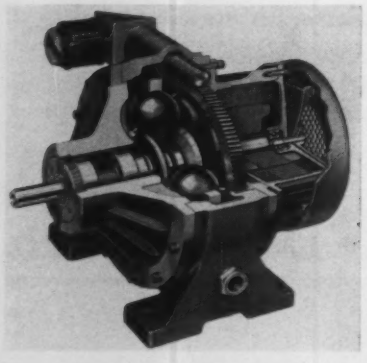
For more data circle No. 23 on postcard, p. 135



Miniature Valves Suit Small-Volume Systems

These tiny valves control the flow direction in oil-hydraulic systems. They suit the small systems used to position jigs, clamp them and shift gears on machine tools. The 4-way valves come in single-and double-solenoid models. They have ⅛-in. pipe-thread, cylinder-port connections opposite the normal, 4-port mounting face. This permits mounting a series of valves on a manifold with lines that connect them directly to the actuating-circuit members. (Vickers Inc., a division of Sperry Rand Corp.)

For more data circle No. 24 on postcard, p. 135



Compact Motor Features Variable-Speed Drive

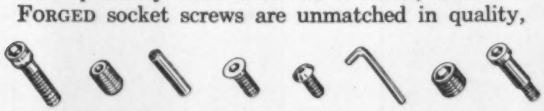
The variable-speed section of this unusual motor has a series of steel balls squeezed between bevelled drive disks. One disk attaches to the input shaft and the other to the output shaft. Speed changes when the circumference of the contact paths on the input and output side of the balls is varied. Each ball has an axial shaft through it. These shafts fit into cam slots in an iris plate that meshes with a control worm. When the worm gear moves, the iris plates rotate. This in turn tilts the axes of the balls, varying the contact-path circumference. Thus, the output speed changes. A torque-responsive mechanism gives constant torque or constant horsepower. The motors range from ⅓-15 hp. (Easton Mfg. Co.)

For more data circle No. 25 on postcard, p. 135

Think Quality...

THE CONSISTENT QUALITY OF HOLO-KROME THERMO-FORGED SOCKET SCREWS CUTS REJECT AND IN-WARRANTY SERVICE COSTS*

Are inspection, in-warranty and replacement costs putting a tight squeeze on your profits? Join other profit-conscious industrial leaders in turning to *quality* to reduce these costs and increase profits. THERMO-FORGED socket screws are produced by a patented electronic forging process which pre-conditions the metal. This makes possible exact control of metal flow, and allows us to maintain tolerances impossible with other forging methods. Thread rolling and subsequent operations are controlled more precisely than ever. As a result, THERMO-FORGED socket screws are unmatched in quality, free from flaws, checks and hidden imperfections, with dimensional precision unattainable with ordinary forging methods. THERMO-FORGED socket screws can materially increase your profits by reducing rejects and in-warranty service costs. See your authorized Holo-Krome distributor or write for more information.



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28 GREAT BRITAIN	2 SPAIN
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9 GERMANY	2 LUXEMBOURG
8 INDIA	1 HOLLAND
7 AUSTRALIA	1 ITALY
6 CANADA	1 RUSSIA
4 BELGIUM	1 SWEDEN
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MORGAN

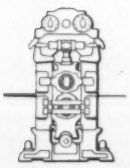
has the know-how to build more of each into YOUR MILL

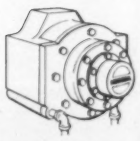
Today's mill must be designed with tomorrow's gauge of operating efficiency and economy foremost in the builder's mind, if it is to compete successfully in the fierce race of the 60's for market advantage.

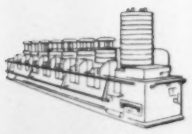
For each of the critical production problems of the era — roll it faster, roll it at lower cost per ton, roll it to ever higher standards of quality — Morgan's unparalleled backlog of design and construction knowledge provides tangible assurance of effective solutions. Here the essential vigor and vision of engineering concepts are soundly balanced, but never stifled, by a depth of experience unique in the industry — bringing the significant advances to bear early and **profitably** on your individual mill's performance requirements.

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

Steel


ROLLING MILLS


MORGOIL BEARINGS

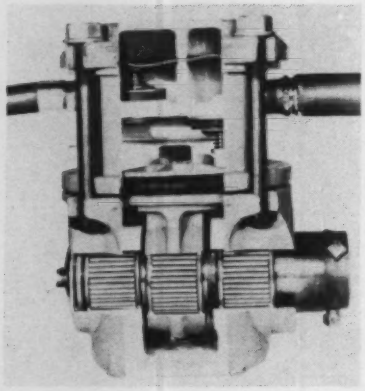

WIRE DRAWING MACHINES

COMBUSTION CONTROL

THE KEY NAME FOR PROGRESS IN STEEL-MAKING EQUIPMENT

Diaphragm-Type Pumps

For pumping abrasive or corrosive liquids or slurries at moderate pressures, a new line of pumps com-



pletely isolate and seal off the liquid. Thus, the pumps' mechanical parts never come in contact with the product being pumped. This increases pump life. Each unit has a short stroke of 3/16 in. and develops 0-6 gpm at 100-psi pressure at 0-600 rpm. At 600-1200 rpm and 60 psi the pump delivers 6-12 gpm. (Hydro-Dynamics Research Industries)

For more data circle No. 26 on postcard, p. 135

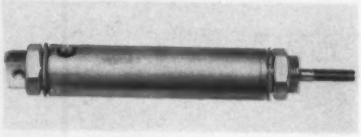
Resists Corrosion

A new adhesive coating becomes progressively tougher and more heat resistant over a period of months. This improvement in strength and durability isn't impaired by an increase in rigidity or brittleness. Thus, the coatings continue to resist rust and corrosion. (Schwartz Chemical Co., Inc.)

For more data circle No. 27 on postcard, p. 135

Air-Hydraulic Cylinder

For jigs, fixtures, and automation equipment, a small air-hydraulic cylinder has stamina and speed. Piston rods are high-carbon steel. They're chrome plated, ground and polished. All parts and seals replace easily. Power factor is 0.60 yielding 60-lb force at 100 psi; 1500-lb at 2500 psi. It's available in 1-in. stroke, spring-return mod-

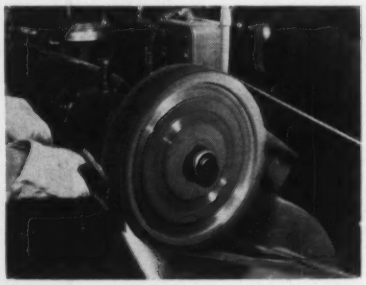


els and in up to 9-in. double-acting models. (Clippard Instrument Laboratory, Inc.)

For more data circle No. 28 on postcard, p. 135

Super-Strength Bond

A strong bond between the rubber "tire" and the metal hub of polishing and grinding wheels prevents explosive failure at speeds to 19,000 rpm. This permits faster polishing. It also improves surface

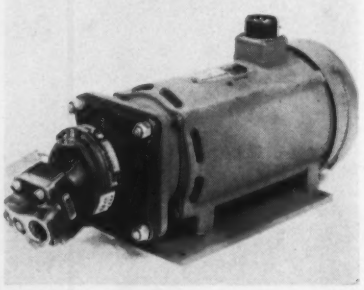


finishes and reduces downtime. The bond results from two adhesives which fasten uncured elastomers to any metal. The bond is stronger than the rubber. (Hughson Chemical Co.)

For more data circle No. 29 on postcard, p. 135

Powerful Pump

The hydraulic power required to open and close the giant swinging tail on a new cargo-carrying aircraft is supplied by a powerful motor



pump. This pump is an axial-piston unit. It has a fixed displacement of 0.134 cu in. per revolution, and it

FAST...
ACCURATE...
RUGGED...

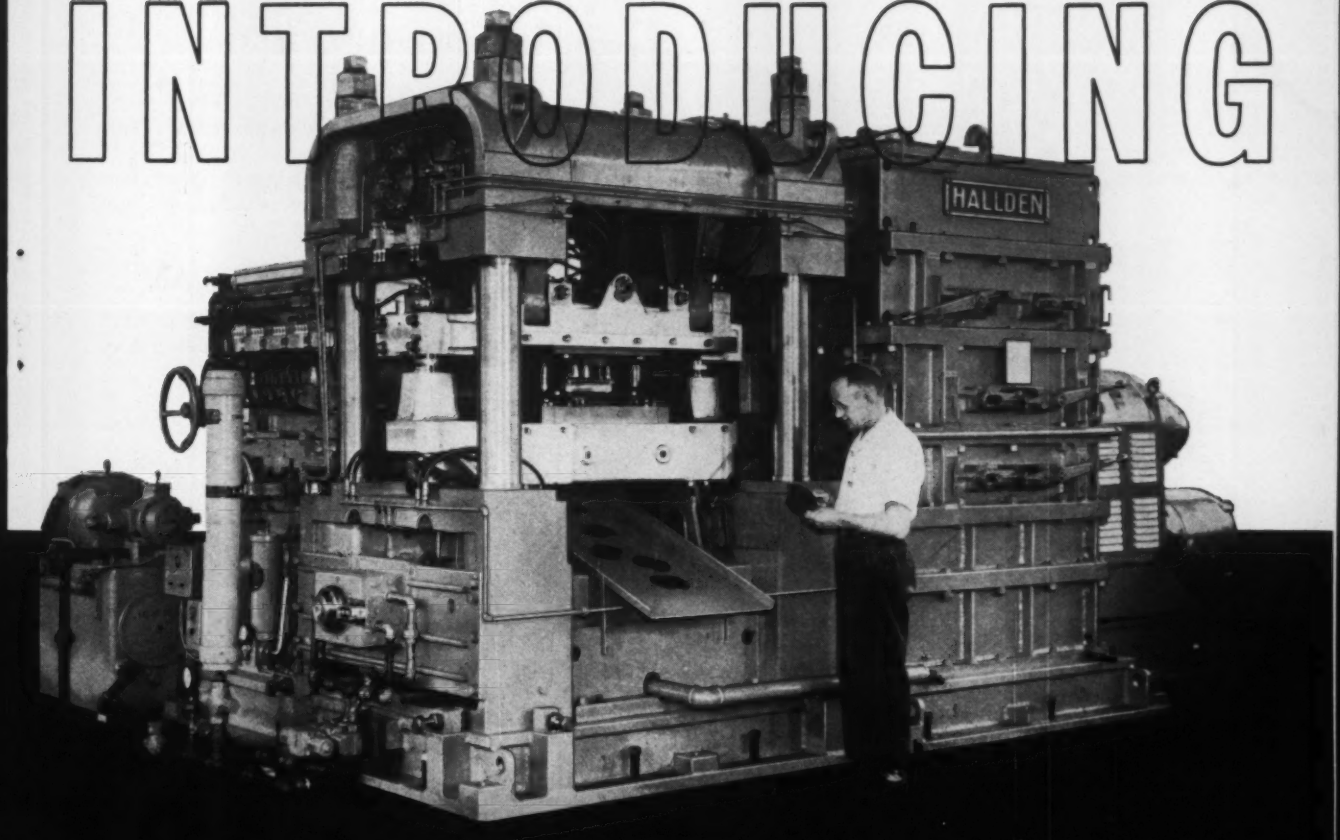
NEW AIRETOOL PNEUMATIC IMPACT WRENCH

Versatile Airetool-designed impact wrench . . . ideal for every high-speed industrial production or assembly need. Heavy-duty, unitized aluminum alloy construction and minimum number of parts give trouble-free, 'round-the-clock service. Lightweight, easy-to-use pistol-type with trigger action and minimum torque reaction on the operator. Impact mechanism does not rely on spring and centrifugal force for operation. Available in two reversible models with ½" bolt capacity. Model 625 — ½" drive square, 626 — 5/8" square. Other features include high run-down speed, low air consumption, self-contained lubrication and air strainer. For complete information, write:

AIRETOOL
MANUFACTURING COMPANY
SPRINGFIELD, OHIO

Representatives in principal cities of the free world.

INTRODUCING



THE NEW DUAL HALLDEN SYNCHRONIZED *FLYING* PRESS AND SHEAR WITH INTEGRAL LEVELLER

- **Continuous Uniform Feed Directly from the Coil**
- **Open Construction for Easy Accessibility**
- **Unlimited Cut Length Range**

Latest Addition to the World Reknown Family of

HALLDEN FLYING CUTTING MACHINES

Equipped with micrometer adjustments for synchronization and feed while the machine is in motion

Engineered and built to meet individual requirements for blanking, shape or square type cutting, or any combination —

Write for design survey of your specific requirements.

DESIGNED AND BUILT BY

HALLDEN

THE SHEARING SPECIALISTS

THE HALLDEN MACHINE COMPANY • THOMASTON, CONNECTICUT

Associates: The W. H. A. Robertson & Co., Ltd., Bedford, England

Your New 1961 Data on . . .

Kinnear Rolling Doors

In any doorway, Kinnear provides an unbeatable combination of lower door costs, extra protection and higher efficiency. Kinnear's upward-acting curtain of interlocking slats (originated by Kinnear!) coils compactly above the opening. All space *around* doorways is fully usable at all times. The curtain opens completely out of the way, closes to give you a rugged all-metal curtain of protection against wind, weather, fire, and vandals. 50 years *and more* of continuous, daily, low-maintenance service have been recorded for many Kinnear Rolling Doors. They're also REGISTERED — all parts of every Kinnear door can always be accurately duplicated from master details kept permanently in fireproof vaults. Get all these Kinnear Rolling Door benefits and more; write for this new 1961 catalog.

and rolling grilles, counter shutters and fire doors

The KINNEAR Manufacturing Co.

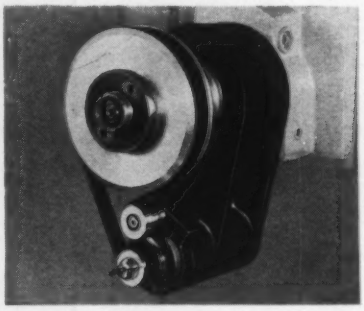
FACTORIES: 1760-80 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, California
Offices and Agents in All Principal Cities

provides a minimum delivery of 4 gpm, 21 psig inlet pressure, 3000 psig outlet pressure. (Vickers Inc., a div. of Sperry Rand Corp.)

For more data circle No. 30 on postcard, p. 135

Surface-Grinding Aid

An unusually compact attachment allows precision surface grinding in hard-to-reach areas. It at-



taches quickly and easily. Models are available to fit most surface grinders. A slipless-belt tension adjustment eliminates strain on the bearings, and the belt contacts 65 pct of the driven pulley's surface. (Speedline Sales Co.)

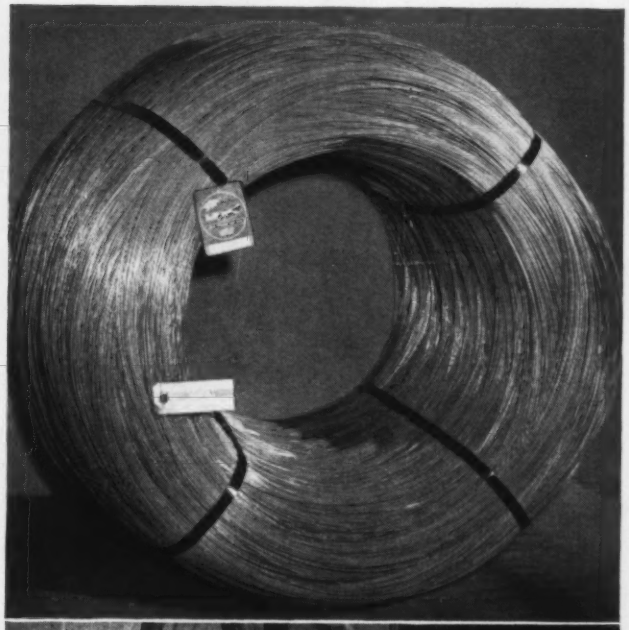
For more data circle No. 31 on postcard, p. 135

Airless Pump

A compact lightweight airless pump combines the advantages of airless spray for medium-production

operations with minimum cost. This unit is suitable for contract-maintenance work, for industrial-maintenance applications and for product

DSC-PORTSMOUTH "LAYER WRAPPED" LPR® COILS GIVE UPHOLSTERY SPRING MAKER OVER 40 MILES OF NON-STOP FABRICATING PER SETUP



LONG PRODUCTION RUN
SNAG-PROOF COILS
AVERAGE OVER 3200 LBS.
.076" HIGH CARBON WIRE

Improved "Layer Wrapping" Method Steps Up Fabricating Efficiency

DSC-PORTSMOUTH DIVISION, Rod and Wire Department, is in routine production and shipment of .076" Upholstery Spring Wire in Long-Production-Run coils averaging over 3200 pounds in weight and over 40 miles in continuous length. One of these coils is shown in the adjacent photograph.

LONG PRODUCTION RUN COILS are not new. For years we have been regularly producing LPR's weighing up to about 4200 pounds. But it is something like crashing a "New Frontier" to produce spring wire LPR's as light as .076" in gauge and weighing over 1½ tons—*and packaged in a way that virtually eliminates the chance of snagging or tangling in your pay-off operation.*

THIS CONTRIBUTION to WIREWORKING EFFICIENCY is one important result of *"layer wrapping" the strands as the big coils are built up.* This mill operation is shown in the lower photograph.

Would cost-reducing, Long-Production-Run, snag-proof coils fit into your brite wire fabricating picture? *For the complete story on LPR's and "layer wrapping", and answers to your questions regarding application, size-weight ranges and prices, call your DSC Customer "Rep" or write: Detroit Steel Corporation, Box 7508, Detroit 9, Michigan.*

Customer Satisfaction—Our No. 1 Job

Customer "REP" Offices in Principal Cities

DSC®

Steel — The Bargain Wonder Metal

Performance Proved

DETROIT STEEL

Flat Rolled and Wire Products

Detroit Steel Corporation—General Sales Office, Detroit 9, Michigan
Cable Address DETROSTEEL—New York

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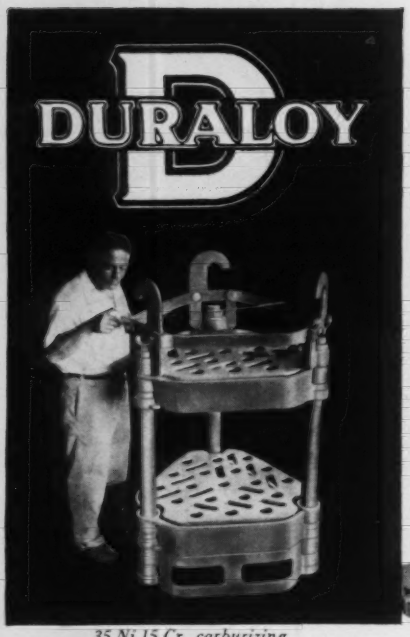
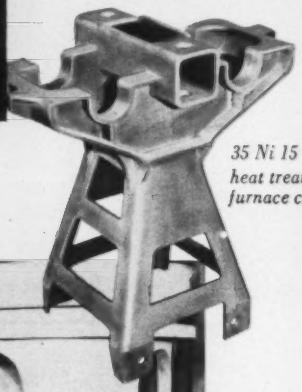


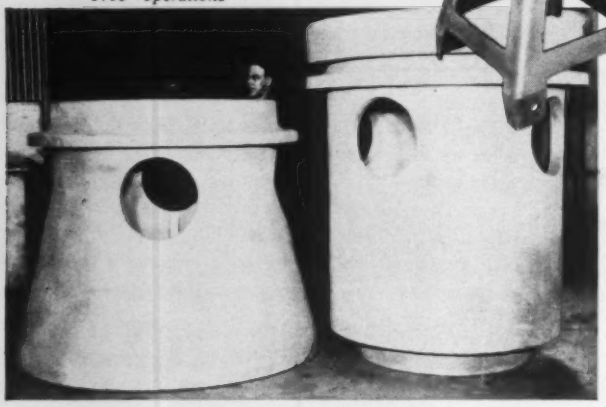
High Alloy CASTINGS for METAL TREATING

35 Ni 15 Cr carburizing furnace casting



35 Ni 15 Cr heat treating furnace casting

Heat treating stools for 1750° operations



● ***Sound castings to withstand the high operating temperatures and wide temperature ranges without deformation.***

Nickel-chrome castings have long been the 'standard' for heat treating and annealing operations—and for close to forty years Duraloy castings have been considered by many metal working plants to be the 'standard' for meeting the industry's sound casting requirements.

The three Duraloy castings illustrated typify the kind of work we do for the metal treating plants.

We're in a position to cast any shape or size and of any alloy to meet your requirements. Send for Bulletin G-159.

ALLOY CASTING INSTITUTE ACI MEMBER

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.

CHICAGO OFFICE: 332 South Michigan Avenue

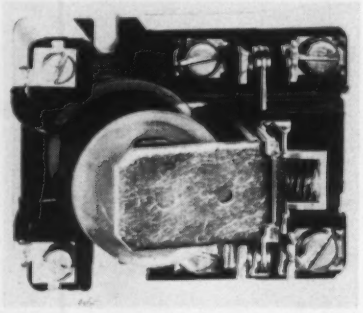
DETROIT OFFICE: 23908 Woodward Avenue, Pleasant Ridge, Mich.

finishing. A chromium piston in a stainless steel tube insures long, trouble-free service. (The DeVilbiss Co.)

For more data circle No. 32 on postcard, p. 135

Relays Control Motors

This complete line of control relays, for self-protected electric motors up to ¾ hp, is available with 6-, 12-, 24-, 115-, 230-, 440-, and

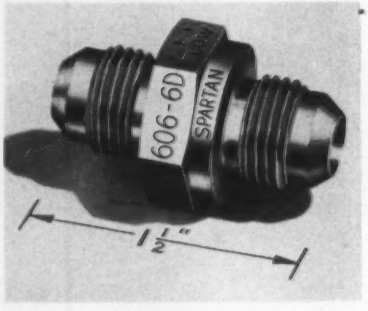


550-v coils, 50- or 60-cycle ac. They also suit other devices such as horns, buzzers, lights, solenoids and valves. (General Electric Co.)

For more data circle No. 33 on postcard, p. 135

Small Check Valves

For operations where pressures do not exceed 60 psi, a new miniature check valve holds pressure drop to less than 1 psi at rated flows. It's compatible with hydro-



gen peroxide, nitric acids, and other fuels. The new valves are available in tube sizes from ¼ to 1¼ in. (Spartan Mfg. Co.)

For more data circle No. 34 on postcard, p. 135

Rounds Corners

Furnishing a smooth transition from square to round, a prefabri-

TOO SLOW ?

Emphatically not! . . . ask any visitor to the 1960 Machine Tool Exposition who watched a Marvel No. 6 Hack Saw Machine cut-off 3¼" diameter 1018 steel in 27 seconds! This Saw, costing less than $3000, was actually cutting at the rate of 18 square inches per minute!

We made the above demonstration merely to "match" what we believe to be the impractical demonstrations of some of our competitors. OUR visitors were warned that continuous cutting at this speed is economically impractical if maximum blade life and accuracy (after the first 20 cuts) are desired. They were told that the material could be cut day in and day out, at the rate of 8 square inches per minute with tool cost of approximately 1 cent per cut.

Our point? Marvel No. 6 and No. 9 Series Heavy Duty Ball Bearing Hack Saw Machines, as we build them today, have speed to spare. And they offer the most accurate, economical cut-off at the lowest initial investment.

Ask your Marvel Dealer to arrange a sawing demonstration—on your own work—if you wish. Because we have consistently built both Hack Saws and Band Saws for more than 40 years, you will get an unbiased recommendation.

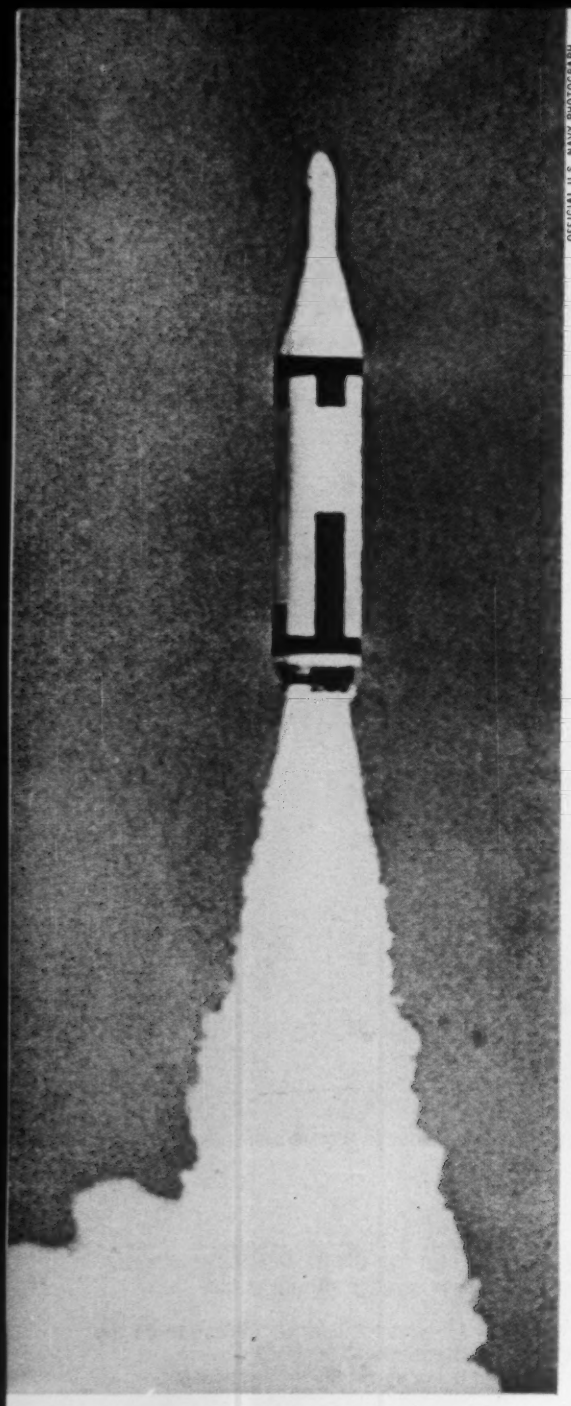
Catalog C60 illustrates and describes the complete line of Marvel Sawing Machines. Write for your copy.

MARVEL *Metal Cutting* **SAWS**

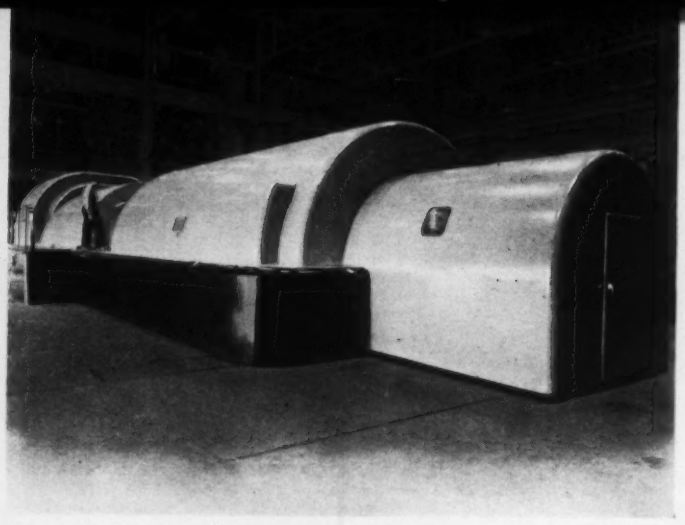
BETTER MACHINES
BETTER BLADES

ARMSTRONG-BLUM MANUFACTURING CO. • 5700 Bloomingdale Avenue • Chicago 39, Illinois

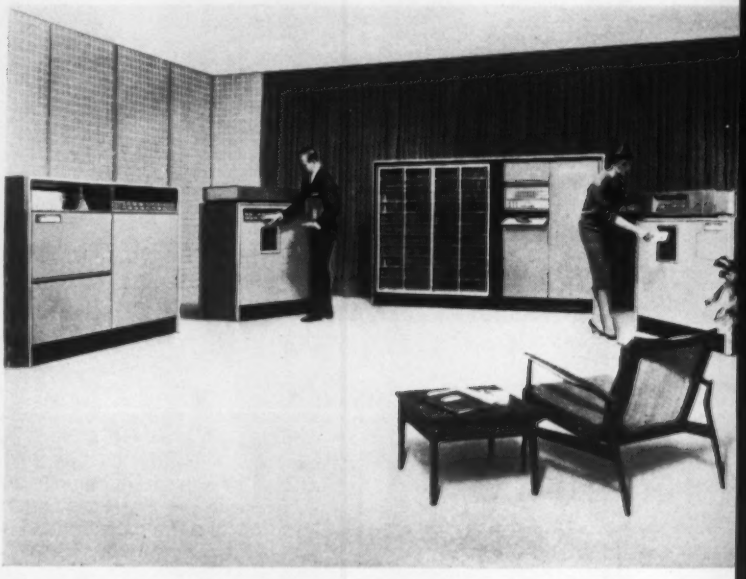
C-1318



Three quarters of the globe serves as launching pad for this Polaris missile designed for subs. Carpenter Stainless forgings assure predictable performance.



Less heat, more power. Hydrogen gas cooling system on this fully super-charged steam turbine demands thin-walled rectangular stainless tubing. For extra strength and uniformity Carpenter Stainless Type 304 was specified.



The "big brain". Carpenter Electronic Alloys provide vital links in these advanced solid-state computing systems. Example: Carpenter HyMu "80" strip is used for pickup heads to help guarantee the necessary high reliability.

Steel

you can do it consistently better with

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.

High flying hybrid. "Blucket" is half fan blade, half turbine bucket. Made from Carpenter High Temperature Alloy V-57, "bluckets" are used in new jet engines for the world's fastest airliner. Here Carpenter quality provides extra measure of safety.

$50,000 toys. That's the cost of tooling up for one of these scale models. Manufacturer specifies "Carpenter No. 484 Tool Steel—no substitute."

Smiles and miles. Joy to pedal pushers everywhere are these bicycle speedometers. Pointer shafts must be reliable . . . are manufactured from Needle Wire from Carpenter's Webb Wire Division.

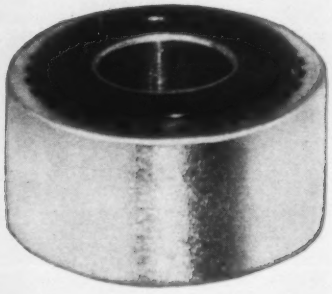
Coast to coast off-the-shelf specialty steel service is available in wide range of sizes and grades. Over twenty fully-stocked Carpenter SERVICE-CENTERS ...all staffed by trained specialists.

Carpenter Specialty Steels for Specialists

Alloy Tube Division, Union, N. J. / Webb Wire Division, New Brunswick, N. J. / Carpenter Steel of New England, Inc., Bridgeport, Conn.

BEFORE BRUSHING
Insulation residue on this small, copper electric motor commutator was a knotty, costly cleaning problem. Rate: 800 per hour.

AFTER BRUSHING
Surface quality-finished . . . insulating material and feather burrs gone . . . ready for trouble-free assembly. Rate: 3500 per hour.



Production soars from 800 to 3500 pieces per hour

...with OSBORN power brushing

PRODUCING at the rate of 3500 pieces per hour (over 330% greater than former off-hand method) these Osborn TY® Master® Wheels remove troublesome phenolic-type residue from electric motor commutators at Dayton Precision Manufacturing Co.

Slow, off-hand methods were being used to remove insulation residue from these commutators. Production was costly . . . parts lacked uniformity.

A specialized, but simple machine now handles the operation. Parts are automatically fed along a guide tube and through a pair of Osborn TY® Master® Wheel brushes. In this centerless type finishing setup—the job is done effectively in pre-set time cycles. Results: production and quality up—rejects eliminated . . . time and costs down.

Cleaning and finishing problems in your plant can be solved with similar production savings. An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost or obligation—is the first step. Write us for full details. *The Osborn Manufacturing Company, Dept. F-108, Cleveland 14, Ohio.*

OSBORN

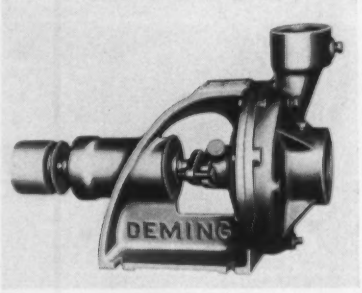
METAL FINISHING MACHINES . . . AND FINISHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY

cated corner transition eliminates the square inside corner common to all rectangular tanks, bins and other metal containers. This provides for easy cleaning and prevents the accumulation of sediment and subsequent corrosion at these hard to reach points. The double corner also acts as a brace to protect the container against damage of the outer corners due to possible bumping or jarring, thus guarding against leaks from this cause. The transition may be welded into existing or new units. Savings in cleaning and maintenance should be possible. They are available in one standard size with two thicknesses of mild steel and grade 302 stainless steel. (Conner Steel Products.)

For more data circle No. 35 on postcard, p. 135

Centrifugal Pump

Equally suited for belt or direct motor drive, an end-section pump employs double ball bearings. Ca-



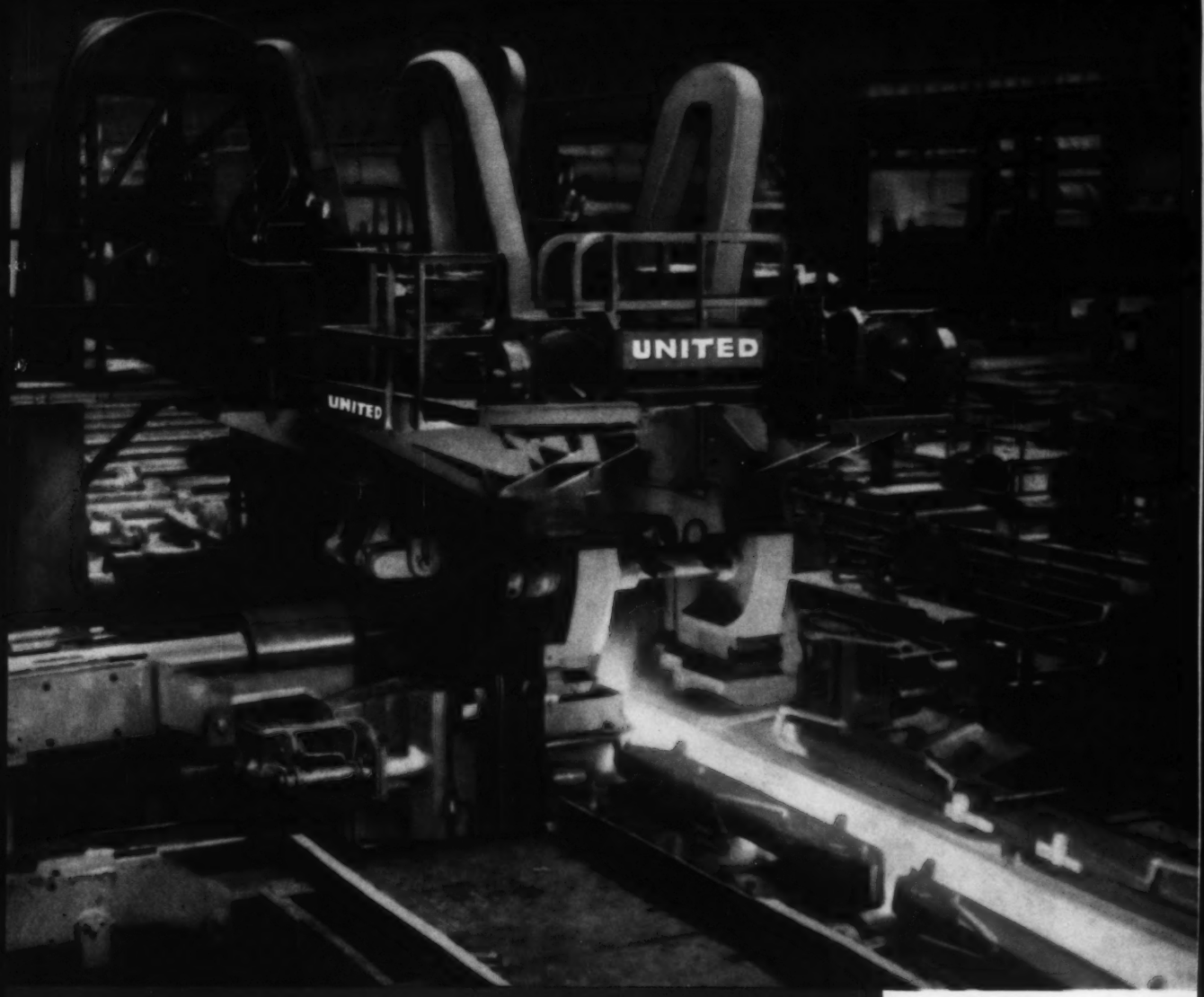
pacity ranges from 10-300 gpm; heads to 150 ft. A semi-open impeller mounts on the stainless shaft with precision taper fit. Its back-pullout feature lets you pull working parts without disconnecting from piping. Stuffing box and gland are standard, but a mechanical seal is available at no extra cost. (The Deming Co.)

For more data circle No. 36 on postcard, p. 135

Booted Universal Joint

A new line of universal joints has oil-resistant Neoprene covers. This allows them to be prepacked with grease. Snap wires hold the cover or boot firmly in place. (Lovejoy Flexible Coupling Co.)

For more data circle No. 37 on postcard, p. 135



UNITED

WIDE FLANGE BEAM MILL

1901 UEFCO 1961

Progress... Leadership United for Sixty Years

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Subsidiaries: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

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Conical

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Energy Cartridge

Extension

Flat

Garter

Hairsprings

Helical

Hourglass

Power

Spiral

Starter

Swivel End

Torsion

Valve

Variable Pitch

Volute

springs

and other things

custom-made to quality standards

Answer your "where to get it" questions– by calling on the versatile experience represented by these typical springs and stamped parts. Here is unusual ability to analyze your part from both design and production efficiency and to make cost-saving contributions where possible. Whether your requirements are large or small, routine or extreme precision, you'll get a better brand of service and quality from the best springmakers in the business.

Send for "Pocket Guide to Springs and Other Things" —a quick picture of our products and services.

Assemblies

Catches

Clamps

Clips

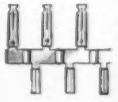
Electronic Coils

Fasteners

Plates

Retainers

Stampings



Terminals

Washers

Wire Forms

0003

Associated Spring Corporation

General Offices: Bristol, Connecticut

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
F. N. Manross and Sons Division, Bristol, Conn.
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.
Raymond Manufacturing Division, Corry, Penna.
Ohio Division, Dayton, Ohio
Cleveland Sales Office, Cleveland, Ohio
Chicago Sales Office, Chicago 46, Ill.
B-G-R Division, Plymouth and Ann Arbor, Mich.
Gibson Division, Mattoon, Ill.
Milwaukee Division, Milwaukee, Wis.
Seaboard Pacific Division, Gardena, Calif.

Canadian Subsidiary: Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que. Puerto Rican Subsidiary: Associated Spring of Puerto Rico, Inc., Carolina, P.R.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Powdered Lubricant

At temperatures from 1100°-2200°F, an inorganic lubricant prevents galling, scoring and metal pickup in forming operations. This lubricant is an eutectoid, a gradually-softening mixture of phosphates and other salts. On hot surfaces it forms an adherent, spreading melt to lubricate forming tools and the metal that's being formed. (The Alpha-Molykote Corp.)

For free copy circle No. 1 on postcard

Stock Bearings

Listing an entire line of standard cylindrical and flange bearings, a catalog also includes valuable technical data. It advises on press fits, running clearances and load capacities for the oilless, metal-plastic bearings. (Arguto Oilless Bearing Co.)

For free copy circle No. 2 on postcard

Metal Display Cases

In six pages, a new booklet tells about complete facilities for the design and fabrication of metal boxes, cabinets and merchandise displays. It explains the planning, design and engineering services provided. Company history and production capacity is also described. (Durham Mfg. Co.)

For free copy circle No. 3 on postcard

Fastening Devices

Various classes of spring-tension fasteners are summarized in a 2-color bulletin. Drawings show designs for different types of fasteners. Case-history examples point out how spring-like stampings simplify assembly, cut costs and improve reliability. (Associated Spring Corp.)

For free copy circle No. 4 on postcard

Circuit Devices

Covering low-voltage distribution equipment, a 92-page catalog serves as a guide to heavy-duty safety switches, circuit breakers, switchboards and the like. It includes ratings, weights, dimensions, standard package quantities, ordering directions and general - usage information. (General Electric Co.)

For free copy circle No. 5 on postcard

Ramming Mix

Uses of high-magnesia ramming mix for open-hearth furnaces are covered in a descriptive folder. Illustrations show typical open-hearth bottoms with the highly-refractory mix. (Kaiser Aluminum & Chemical Sales, Inc.)

For free copy circle No. 6 on postcard

Adhesives

In 54 pages, a letter-size catalog details government specifications for a wide variety of adhesives, coatings and sealers. It numerically lists Military specs, defines them, indicates their use and shows the corresponding adhesive, coating or sealer that meets these specifications. (Minnesota Mining & Mfg. Co.)

For free copy circle No. 7 on postcard

Electric Chain Hoists

Fourth in a series, a specification sheet describes electric chain hoists. Other booklets available deal with electric wire rope, hand chain and manual lever-operated hoists. (Hoist Manufacturers Assoc., Inc.)

For free copy circle No. 8 on postcard

Die Castings

Fully illustrated, this brochure describes facilities for the design and production of aluminum and

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FREE LITERATURE

zinc castings. It gives background information and illustrates plant operations, production and engineering. (Newton-New Haven Co.)
For free copy circle No. 9 on postcard

Nylon Stock Shapes

Nylon forms, made from a new formulation, are the subject of a 4-page booklet that tells about their physical properties and suggests uses for the stock shapes. Included are many unusually large sizes of rod, tubular bar and plate. (The Polymer Corp.)
For free copy circle No. 10 on postcard

Power Vibrators

Action photos, drawings and engineering data supplement the text of a 4-page folder that describes a line of vibration inducers. It lists available power options for many different uses where a powerful, lightweight vibrator is necessary. (Martin Engineering Co.)
For free copy circle No. 11 on postcard

Pumps Under Water

In full color, an attractive brochure covers a submersible pump. It includes performance data, and curves, cut-away diagrams, application and product pictures and other general information on the 3-in., electric-powered units. (The Gorman-Rupp Co.)
For free copy circle No. 12 on postcard

Etching Aid

The properties and advantages of a coating that resists copper-plating solutions are described in a new booklet. The coating is useful in the production of printed circuits. (The Meaker Co., a subsidiary of Sel-Rex Corp.)
For free copy circle No. 13 on postcard

Ring Sprockets

Comprehensive listings of stock ring sprockets fill five pages in a company bulletin. It also outlines tolerances and illustrates some applications of the line. (American-Marietta Co.)
For free copy circle No. 14 on postcard

Mining Tools

The details on 28 styles of carbide mining bits are given by a large catalog. It also mentions special carbide grades, mining tool identification. Detailed drawings show each mining tool. (Allegheny Ludlum Steel Corp.)
For free copy circle No. 15 on postcard

Removes Rust

Titled "Rust Remover 3503," a data sheet describes a product that removes rust, gives an iron-phosphate coating and cleans light soil. The chemical should save time and labor costs. (E. F. Houghton & Co.)
For free copy circle No. 16 on postcard

Management Films

The 1961 edition of the Industrial Management Society's film rental catalog describes the 88 available films. They are 10-15 minutes long and picture on-the-job training and work-simplification projects for plant and office.
For free copy circle No. 17 on postcard

Miniature Lamps

Tiny lamps, which are proving useful in many industrial and technical applications, are dealt with in a new bulletin. Depicting all 14 stock styles in actual size, it also gives the electrical characteristics of each. (Welch Allyn, Inc.)
For free copy circle No. 18 on postcard

Materials Handling

The uses of narrow-aisle electric trucks and hydraulic hand-pallet trucks are illustrated with on-the-job photos in a recent catalog. A 2-page center spread features the line's telescopic mast. Other pages illustrate all the models. (The Raymond Corp.)
For free copy circle No. 19 on postcard

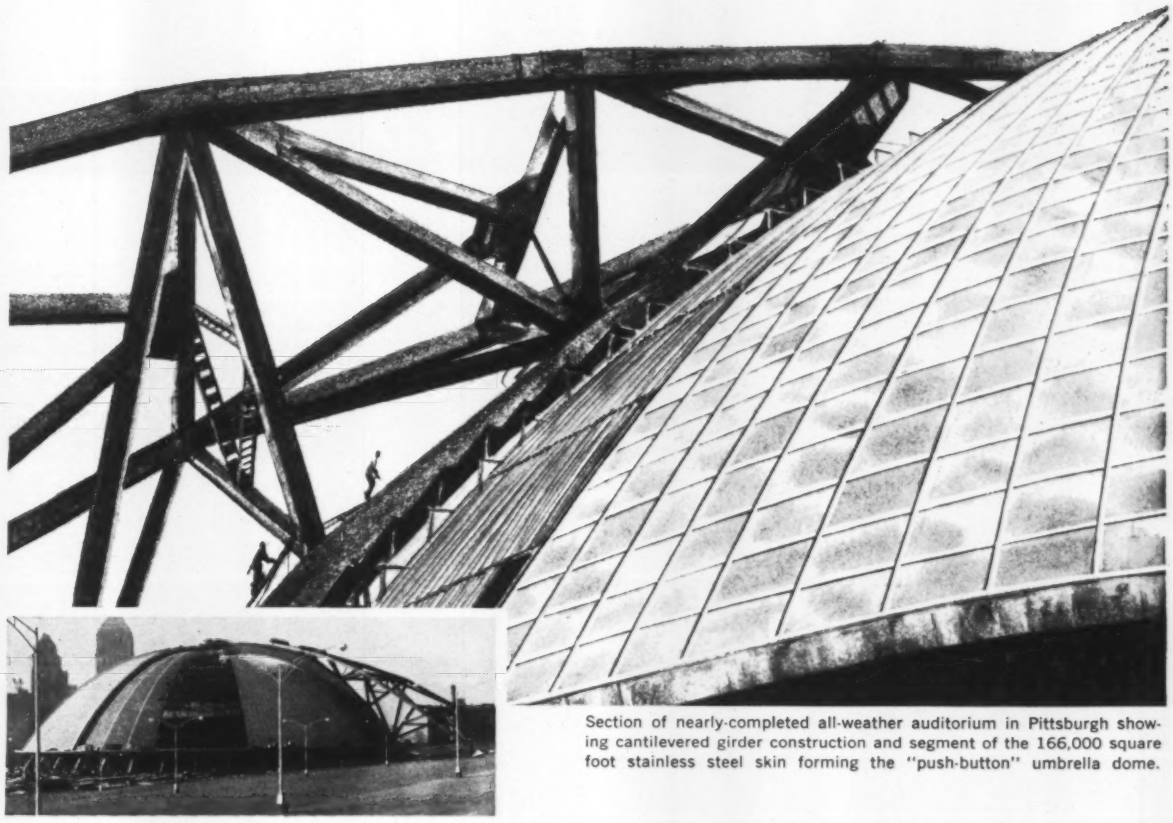
Power Transmission

This catalog describes and lists thousands of stock parts for all types of mechanical power transmission. Included are belts, sheaves, pulleys, roller chain, sprockets, bushing systems, couplings and hubs. (Browning Mfg. Co.)
For free copy circle No. 20 on postcard

Milling Machine

A folder illustrates important features of a new horizontal boring and milling machine. It analyzes design improvements and furnishes specifications. (S & S Machinery Co.)
For free copy circle No. 21 on postcard

when you're producing Electric Steels



Section of nearly-completed all-weather auditorium in Pittsburgh showing cantilevered girder construction and segment of the 166,000 square foot stainless steel skin forming the "push-button" umbrella dome.

GLC Electrodes will give you these extra values

When you specify GLC electrodes you get a product of **superior quality, plus** such extra values as...
unceasing research that leads to steady product improvement...
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and **technical service** for customers that is remarkably prompt and competent.
These extra values are important as they provide a substantial share in the reduction of melt-ton costs.

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67 years of service to the Industrial Middle West

INLAND STEEL IS HERE

Here . . . is a broad and vigorous territory—taking in almost all of Texas, all of Alabama, Louisiana and Mississippi, the western third of Georgia and the southern part of Arkansas.

In Texas, ever-busy steel fabricators build huge refineries, storage facilities and equipment for the oil and petrochemical industries—set the stage for hundreds of supporting industries. In Louisiana, home of the Mardi Gras and Dixieland Jazz, 5,000 miles of navigable waters spawn great shipbuilding enterprises and the great seaport of New Orleans. In Georgia, vast deposits of marble, clay and limestone exist, and here is Atlanta, largest manufacturing city in the Deep South. Alabama offers tremendous coal fields, great textile, furniture, pulp and paper and many other important industries. And in Mississippi, King Cotton rules while sugar, lumber, natural gas, oil, marl, cement rock and light manufacturing add millions to the state's rich income.

In the brief time Inland has been in the area, many steel consumers have already learned that Inland's reputation for fast service and dependability, is second to none. And everywhere, as a major producer of wide flange beams, standard structurals, bearing piles, sheets and bars, Inland is swiftly becoming well-known not only for the quality of its products, but for immediate answers to inquiries and amazingly fast service.

One of a series depicting market areas served by Inland · Art by Franklin McMahon

Inland, too, has liked what it has seen—the land and its people. Liked it so well that already it has expanded its service facilities to include not only its District Office at Houston, but resident representatives at Dallas and New Orleans. Located strategically on the Great Lakes and the rivers leading directly into the mighty Mississippi River, Inland can quickly pool-barge loads to Houston, New Orleans, Vicksburg, Greenville, Guntersville and Memphis for year 'round distribution from these points.

Already Inland has come to know the steel needs of cities like Birmingham, Dallas, Fort Worth, Houston, Atlanta, New Orleans, Jackson, Greenville and Shreveport. And for Inland, "knowing" is an essential part of serving.

In this territory of exciting growth and industrial expansion, Inland too, sees a land of opportunity —sees a future unlimited. Yes, Inland is *here*, and here to stay.

INLAND STEEL COMPANY

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Sales Offices: Chicago • Davenport • Detroit • Houston • Indianapolis Kansas City • Milwaukee • New York • St. Louis • St. Paul

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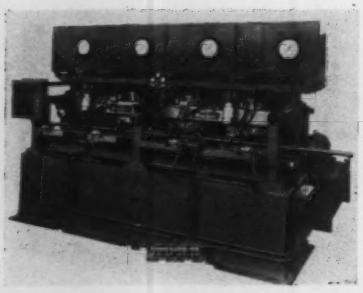
New Equipment and Machinery



Transfer Leak Tester "Remembers" Bad Parts

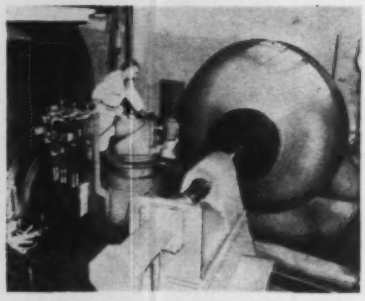
In this test machine, counters keep track of the bad parts. In the event of five consecutive failures, the machine automatically shuts down. Then the operator checks to see where the trouble lies. The machine tests cylinder heads, but it modifies to accept other similar parts. Here's how it works. The part slides into a fixture. Clamps secure it there. Then, air is pumped in. Should the part prove defective, it shows on the dial. A red light appears. If it's okay, a green light gives the go ahead. This opens a valve that releases marking dye. (Turner Bros., Inc.)

For more data circle No. 38 on postcard, p. 135

World's Largest Draw Bench Handles 40-ft Pipe

The world's largest-known draw bench spans 166 ft, with its rams extended. Everything about it is big. That includes capacity. Weighing 450 tons, with a 44-ft stroke, it draws pipe with a 20-in. diam. Lengths up to 40 ft are no problem. With this length, the pipe can have a 1-in. wall thickness. Despite the large pipe sizes, the machine yields accurate inside and outside dimensions. It includes a die arrangement that points the tube for holding purposes. Normally, a separate machine is necessary for the pointing operation. (Lake Erie Machinery Corp.)

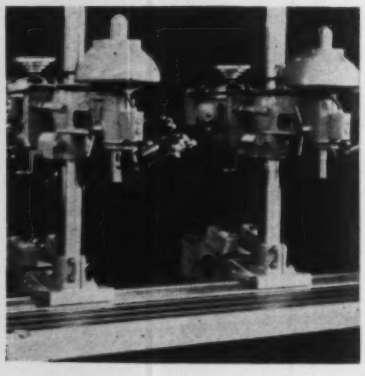
For more data circle No. 39 on postcard, p. 135



Massive Spinning Machine Shapes Stainless

This hydraulic spinning machine forms stainless and other high-tensile steels. Intricate shapes, including reactor-seal membranes and reentrant curves common on venturi thrust chambers, are a specialty. Its rolling tool exerts more than 300,000 psi to form either hot or cold steel. For the hot forming the machine uses an unusual heating system, fired by a mixture of liquid propane gas and oxygen. This system, coupled with the extreme pressures, permits spin forming of the "rarer" refractory metals. The process substitutes for forging. (C. W. Torngren Co., Inc.)

For more data circle No. 40 on postcard, p. 135



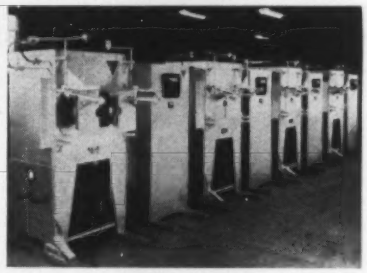
Drilling Unit Solves Channel-Forming Problem

How do you fabricate extruded aluminum channels into square or rectangular frames? First, drill them as a straight piece. Then, form to the required shape. But, the holes must line up. The key to the process is a specially-designed, 8-spindle drilling machine. It drills all the holes simultaneously, without using drilling jigs. Just as important, it permits variation in the hole patterns to suit different frames. Each drill unit mounts on a dove-tail slide block. A single switch activates all eight feeds. Heads that aren't wanted in certain setups are cut out by toggle switches. The machine drills up to 32, accurately-spaced holes at one touch of the master foot switch. (Buffalo Forge Co.)

For more data circle No. 41 on postcard, p. 135

Heat-Treating Furnace

Rapid heat-up and recovery, flexible heating cycles and a range of sizes suit a general-purpose, heat-

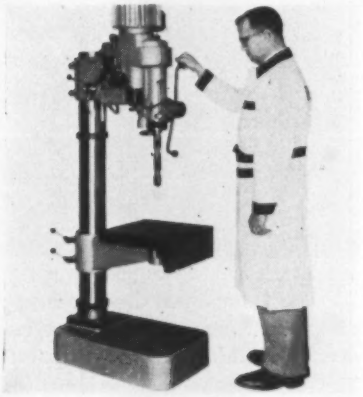


treat furnace for shop, tool room or lab use. One interesting feature is the air-operated, side-hinged door arrangement. Doors are foot controlled. This leaves the operator's hands free for loading or unloading the furnace. (The Pereny Equipment Co.)

For more data circle No. 42 on postcard, p. 135

Larger Drill Press

In addition to 18- and 24-in. Swedish-built, geared-head drill presses, a 25½-in. unit is now available in the line. It drills 1-in. holes in cast iron, and 1½-in. holes in steel. Additional features include a 2-speed motor rated at 2½ hp at 1725 rpm, 5½-in. diam column and



6-in. maximum spindle travel. It has three feed rates: 0.004, 0.008 and 0.012 ipr. The gears run in oil. (Boice-Crane Co.)

For more data circle No. 43 on postcard, p. 135

High-Purity Anodes

Tin-lead solder anodes of virgin metal, so pure they eliminate sludge deposits, are available in extruded

14" HIGH

NEW!

HIGHEST-RATED, LOWEST-PRICED ($11.95 RETAIL) 2½ LB. DRY CHEMICAL EXTINGUISHER

Now — thanks to the new Kidde Kompact — here's high-power fire protection at a rock-bottom price! Highest-rated, lowest-priced 2½ lb. dry chemical extinguisher on the market, the new pressurized Kidde Kompact packs as much fire-killing power as extinguishers costing twice the price. Equal to eight one-quart carbon tet units, the new Kidde Kompact mounts snugly, works simply — just lift the handle and press the lever.

And . . . there's no recharging needed. Just unscrew the used cylinder, replace with another, only $3.95. At the low, low price of just $11.95, no one should be without a Kidde Kompact. U.L. and U.S.C.G.-approved. For more information, see your dealer or write Kidde today!

Kidde

Industrial and Marine Division

Walter Kidde & Company, Inc., 349 B Main Street, Belleville 9, N. J.

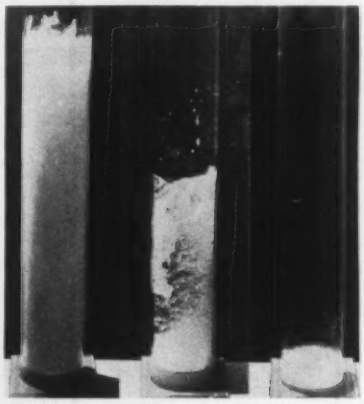
Walter Kidde & Company of Canada Ltd., Montreal—Toronto—Vancouver

form. As a result, they corrode more evenly than the cast type. They come in three shapes; round, elliptical and flat. The round anodes are extruded in 1½- to 2-in. diam. Flat anodes come in a range of dimensions. Each shape is for use with a variety of reusable hooks or cast-copper hooks that are solder-coated and bound to the anode stock. Primary use is in plating electronic components and printed circuits. (Alpha Metals, Inc.)

For more data circle No. 44 on postcard, p. 135

Sonic Defoamer

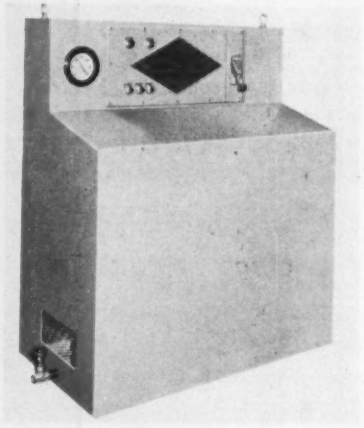
Moving parts are absent from a sonic defoamer that uses an air jet to generate high-intensity sound waves. These waves shatter bubbles and disintegrate foam. Each unit has its own air-pressure regulator. Therefore, all that's necessary for installation is an air pressure source over 30 psi. The defoamers destroy foams generated by cleaning chemicals and detergents, pharmaceuticals, photo chemicals and many other liquids. (Teknika, Inc.)



For more data circle No. 45 on postcard, p. 135

Vacuum Simulators

Low-cost vacuum simulators now test any part that operates by vacuum. They duplicate any vacuum condition, and permit functional, complete-cycle testing of a part. The self-contained, motor-driven equipment eliminates actual engine operation during inspection or test. The line includes units suitable for testing hardware requiring ½- to 60-cfm capacity. Larger simulators come on special order. (Prenco Mfg. Corp.)



For more data circle No. 46 on postcard, p. 135

Heat Plastic Sheets

Plastic-sheet preheating ovens, equipped with air-operated doors, leave the operator's hands free. This

The Pangborn Vibratory Finishing Machine

THE LONGER YOU OWN IT, THE MORE USEFUL IT IS!

"Every day we find new pieces it can finish," comes the word from the large, Midwestern die-casting firm shown above. And no wonder!

This machine makes itself useful in many ways: cleaning, descaling, radiusing, fine-finishing, burnishing or coloring. It can do all this with metals, alloys, many types of plastic and ceramic parts . . . and at speeds up to 100 times faster than conventional methods. It cleans the intricate or shielded surfaces you can't reach with barrel finishing or other means.

Available in many sizes, the Pangborn Vibratory Finishing Machine is the most compact unit in its field. Its standard equipment includes variable speeds and an exclusive air-cushioned suspension which assures automatic leveling and amplitude control. Auxiliary equipment, media and compounds available for every need.

Send parts with exact finish specifications or finished specimen, for sample processing in our laboratory to: Mr. William E. Brandt, PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control, Blast Cleaning and Vibratory Finishing Equipment—Rotoblast® Steel Shot and Grit.®*

Pangborn
OF HAGERSTOWN

centrifugally cast

Stainless Steel

SLEEVES • LINERS
CORED BAR STOCK

In a rush? Order from Vollrath for immediate **off-the-shelf shipment.** All 13¼" long, Semi-machined to 1/16" of sizes listed. Uniform quality.

TYPES 304 and 316

O.D.	I.D.	O.D.	I.D.	O.D.	I.D.
2½	x 2	4	x 2	4½	x 3½
2¾	x 2		x 2¼		x 3¾
	x 2¼		x 2½		x 4
3	x 2		x 2¾	4¾	x 2¼
	x 2¼		x 3		x 2½
	x 2½		x 3¼		x 2¾
3¼	x 2		x 3½		x 3
	x 2¼	4¼	x 2		x 3¼
	x 2½		x 2¼		x 3½
	x 2¾		x 2½		x 3¾
3½	x 2		x 2¾		x 4
	x 2¼		x 3		x 4¼
	x 2½		x 3¼	5	x 2½
	x 2¾		x 3½		x 2¾
	x 3		x 3¾		x 3
3¾	x 2	4½	x 2		x 3¼
	x 2¼		x 2¼		x 3½
	x 2½		x 2½		x 3¾
	x 2¾		x 2¾		x 4
	x 3		x 3		x 4¼
	x 3¼		x 3¼		x 4½

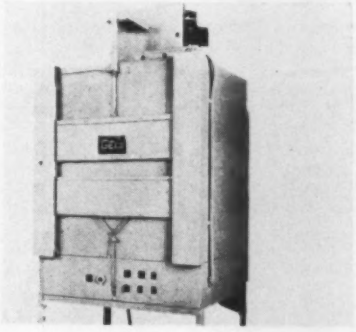
PHONE • WIRE • WRITE

the **Vollrath** Co.

FOUNDRY DIVISION
Dept. IA, Sheboygan, Wis.

For sheet stainless steel items, drawn or spun, consult our Contract Sales Division.

means faster cycles. Ovens are forced-convection types with automatic thermostats. High air flow insures even temperatures with no danger of overheating. They're available in three sizes to handle 1½-, 2- and 3-ft square sheets. Teflon-lined shelves prevent sticking. Single-end models need one op-

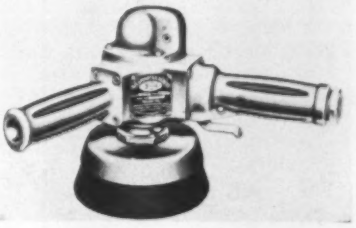


erator. Double-end units allow two operators to work from a single oven without interference. (Gruenberg Electric Co., Inc.)

For more data circle No. 47 on postcard, p. 135

Vertical Air Grinders

Two series of vertical air grinders will both operate as depressed-center or flared-cup wheel grinders, wire-brush tools or disc sanders. Newly-designed air motors provide air behind the vanes for quick starting. Sealed lower bearings prevent air and oil leaks. Three ball bear-



ings are used: one on each end of the motor and one in the governor to insure smooth running. (Albertson & Co.)

For more data circle No. 48 on postcard, p. 135

Radiation Pyrometer

For use with a receiver-recorder, a radiation pyrometer gages temperatures up to 4000°F. It works in industrial furnaces, glass tanks, openhearth furnaces and rotary kilns. It measures the radiation in-

Straits Tin Report

Tin-lined copper tube recently developed combines tin's corrosion resistance and malleability with the strength and ductility of copper. Pure molten tin is gas-propelled through the tubing to form a continuous, fusion-bonded tin lining that will not chip, crack or peel, and can be

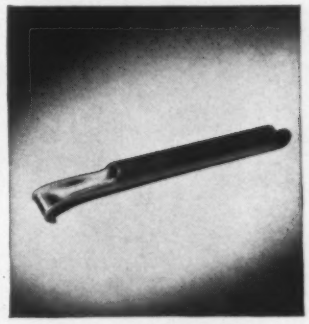


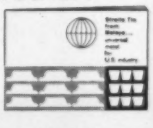
Photo courtesy Phelps Dodge

bent, flared, flattened or soldered. Tin provides immunity to corrosive sulfur conditions found in some natural gas and petroleum products; affords excellent resistance to flaking action that can plug lines and orifices and create hazards with gas appliances. The tin lining also prevents contamination of fluids in process lines of food, beverages, pharmaceutical and water distilling equipment and for sampling lines to laboratory or control instruments, according to its producers, Phelps Dodge Copper Products Corp.

Acid pickling of steel before hot tinning produces maximum bond strength of bearing metal to steel. Shot blasting preparation lowers bond strength, possibly because of distortion, folding and flowing during precleaning.

FREE Brochure

16 interesting pages of information about the latest uses of tin in U.S. industry. Write today for your copy.



The Malayan Tin Bureau
Dept. S-54C, 2000 K St., N.W., Washington 6, D.C.

a URICK policy . . .

PRODUCTION RUNS* MADE TO MEASURE

**URICK considers 10 pieces and over a production run . . .*

Good castings must measure up more than dimensionally. The URICK policy starts with the design and a complete orientation of what part the casting is to play in the complete assembly. After this product study, URICK is often asked to suggest or recommend the best material for the application . . . URITE Gray Iron or URICK'S Ductile Iron. Then each progressive step, (the pattern, sand, mold, pouring, cooling, heat treating, handling, finishing and shipping) is important toward URICK'S casting success. URICK'S trained team, using the latest modern facilities available, will take your assignment and carry it through to a successful conclusion.

Contact URICK, the foundry that starts with "U" and stays with you. Write for advanced technical data about URITE gray iron castings.

URITE CASTINGS

URICK FOUNDRY

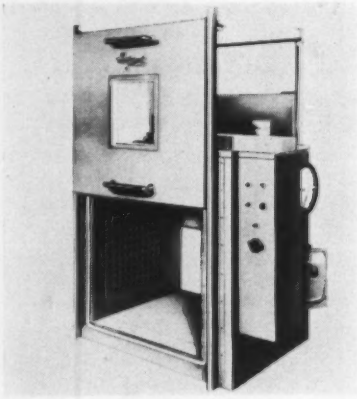
ERIE, PENNSYLVANIA

tensity and, with an electrical receiver, converts the radiation measurements into temperatures. Accuracy within 1 pct of the temperature span is common. (Bailey Meter Co.)

For more data circle No. 49 on postcard, p. 135

Quick Heating

Mechanically - convected, pass-through ovens with lift-sliding doors quickly heat large loads of electronic components, paints, metals and chemicals. They operate at 600°F. Lightweight sliding doors prevent large time or heat losses during loading or unloading. An oversized high-velocity motor and blower insure rapid heat transfer and uniform temperatures throughout the chamber. Fresh air is heated and horizontally convected in the work area. For maximum safety, heating elements operate at low wattage and low surface temperatures. A 4-in. blanket of insulation and a thermal heat breaker stop costly radiation to exterior surfaces. (The Electric Hotpack Co., Inc.)



For more data circle No. 50 on postcard, p. 135

Clears Factory Aisles

Factory aisles and drives free of metal chips and filings promote safer operation. To accomplish this, a hand sweeper, with a powerful magnetic tube, picks up ferrous contaminants along its entire length, to a depth of ¾ in. The tube detaches for magnetic retrieving in water tanks or difficult corners. The per-

manent magnetic element will never lose its efficiency. Unloading and cleaning the unit is easy, and a

neoprene wiper ring protects the operator's hand during the process. (Eriez Mfg. Co.)

For more data circle No. 51 on postcard, p. 135

Difference Counter

An electronic measuring device gages two different variables at the same time and shows the difference between them. It monitors two shafts to maintain a desired rpm. If one or the other overruns or fails to maintain its desired speed, the device interprets this condition instantly. Then, through external circuits, it makes the necessary corrections, or shuts the operation down, automatically. (Post Electronics)

For more data circle No. 52 on postcard, p. 135

Toxic-Fume Protection

While protecting against radioactive dusts, a respirator allows easy

breathing. It also guards against dangerous mists, fumes and smoke, airborne bacteria and certain viruses. A clear-plastic case seals the filter against damage during handling. There's an exhalation valve at the bottom of the facepiece. A metal guard protects it. Two natural-rubber inhalation valves inside the facepiece admit air when you inhale—close tight when you exhale. (Willson Products Division, Ray-O-Vac Co.)

For more data circle No. 53 on postcard, p. 135

Colorful Epoxy Coating

Research and development are complete on a remarkable new protective coating. It sprays, rolls or brushes onto any surface under all weather conditions. This is the first time that a self-priming, epoxy-based coating has been perfected for so many applications. It's available in 20 colors. With a built-in plastic "membrane," just one coat is all that's needed on most jobs. The coating is resistant to moisture, salt water, corrosive liquids and gases. (Bradco Plastics, Inc.)

For more data circle No. 54 on postcard, p. 135

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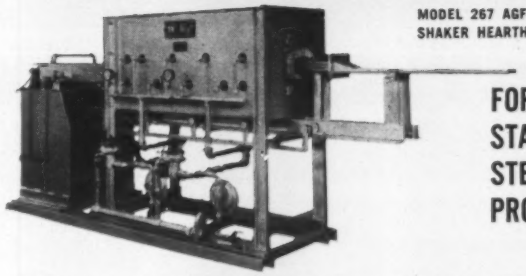

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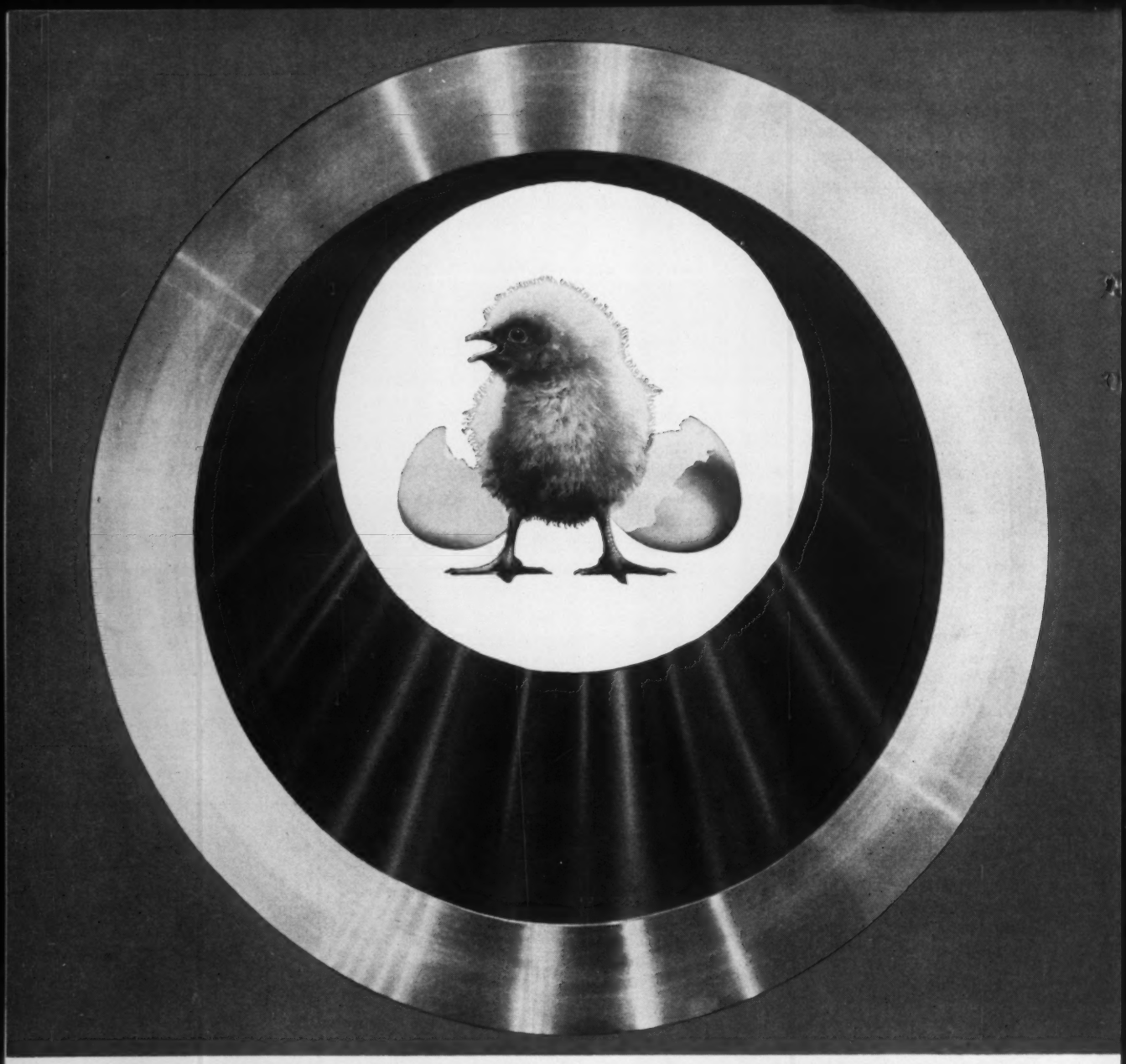

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*Patent applied for

ACIPCO CERAM-SPUN®
STEEL TUBING

April Gains Coming After Lag

Though the market recovery has slowed, a better April is assured for steelmakers.

The ordering pattern has changed. More orders are now placed in the month they are delivered.

■ The slow recovery of the steel market in recent weeks has hit a flat spot, but a better April apparently is still assured.

The outlook for better orders and shipments for April is unchanged, but consumers are not translating better feeling into advanced ordering. Going into the last week in March, new orders were little or no better than they were a month earlier.

Forecasts Still Hold — At the same time, mills are sticking to their predictions of at least 95 million tons of steel produced this year. Steelmen believe their predictions are very much on target.

In the face of no improvement in advance ordering for April, some of the optimism might seem to be misplaced. However, on the basis of expected steel consumption for the month, steel orders will have to come in.

Wait and See—For one thing, the pattern of steel ordering has changed. A much larger portion of orders is now placed in the month of delivery. For this reason, advance orders are not necessarily an indication of the real strength of the market.

Here and there, a little more forward planning of steel buying is noted. But it is not enough to make any substantial change in delivery promises. Most products can be obtained with a minimum of lead time. With delivery still a competitive factor in steel ordering, mills continue to carry large tonnages of finished and semi-finished steel to assure rapid delivery. Customers are using this to the limit.

Strong Points — Some strong points in the market are in evidence this week. One is a definite strengthening of the market on the West Coast. This is traditionally a good sign of improved business to follow in other areas of the country. Steelmen note one specific order in the West that would make the market look better overall, but insist that general business there is improved.

Coated products are also showing added strength. Tinplate is now coming in at a stronger rate and predictions now are that 1961 will be a good year for the product. Galvanized is also strong.

Automotive Angle—The missing element in overall improvement continues to be automotive steel buying. But, at least it will not be a negative factor. Optimism that is noted this week takes into account the gloomy automotive outlook.

Another factor that is indicative of steel buying practices is that the tonnage now on the books for May is negligible. In the past, orders for cold-rolled sheets for that far in advance would have been on the books by now. Of course, automakers have given an indication of May (probably a bit better than April), but have not placed orders as yet.

The outlook now is for a continued, but small, improvement in April. This is expected to extend through May and June.

The second half promises to see more significant gains, after taking into account a probable dip during the summer doldrums.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	89	89	88	127
Buffalo	66	67	77	151
Pittsburgh	79	77	79	135
Youngstown	71	63	69	140
Cleveland	70	67	71	174
Detroit	92	90	86	154
Chicago	94	93	92	147
Cincinnati	87	89	84	146
St. Louis	104	101	108	122
Southern	100	93	88	132
Western	108	108	100	119
U. S. Index	85.5	84.5	84.8	139.4

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	1,611	1,574	18,326	32,123
Ingot Index				
(1957-59=100)	86.5	84.5	82.0	143.7
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel, base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$39.17	$38.50	$34.50	$33.17
No. 2 bundles	$27.83	$27.83	$24.83	$22.33

Internal Audit Draws Interest

Recent events have spotlighted importance of internal auditing of purchasing.

Buyers deluge auditor group for information on subject.

■ A hard light has lately focused sharply on purchasing. Its the probing light of the internal audit.

According to some internal auditors, a great many purchasing agents have no clear idea of just what is an internal audit. This is not a reflection on these purchasing men, they say. Internal auditing has not yet come into their sphere of activities. But it is coming to more and more purchasing men every day.

Recent Events — Several recent events have given impetus to this trend. Last winter the Chrysler Corp. "conflict of interest" buying story broke in the nation's headlines.

In October, a Senate subcommittee under Sen. Paul Douglas (D., Ill.) scalded buying practices used in defense procurement.

And the more recent pricing charges against some companies in the electrical equipment industry have led concerned managements to take a new hard look at buyer-seller relations.

New Interest—In the first few weeks after the Chrysler conflict-of-interest situation broke in the news, the Institute of Internal Auditors received hundreds of requests for their research report on auditing of purchasing departments. These came mostly from purchasing agents. But others were from company auditors and from management.

In terms of mail normally received by the Institute, this was an "avalanche." It usually goes about its business quietly and steadily. This business is to promote the cause of sound internal auditing. The Institute has nearly 5000 individual members from some 1200 companies in the U. S. and in many foreign countries.

Every six years the Institute conducts an extensive survey of its members. In a 1951 survey it was learned that 50 pct of the companies made audits of their purchasing departments. The latest survey, made in 1957, showed that 70 pct of the companies audited purchasing. And managing director, Bradford Cadmus told The IRON AGE that any survey conducted today, "would show a big jump in the percentage of companies that now audit purchasing."

NAPA Interest — There is another development that is bringing internal auditing closer to purchasing. Last year, a committee of the National Assn. of Purchasing Agents completed its investigation of internal controls for use within purchasing departments. The committee has made a report to the Professional Development Committee and it is expected that an Association hand book on the subject will be issued.

A. G. Ruediger, Carrier Corp. purchasing director, who was chairman of the Internal Controls Committee, told The IRON AGE that "very great interest" has been shown in the subject by association members. His committee ran "buzz" sessions on the subject at two national conventions of the association.

The internal controls recommended by Mr. Ruediger and his group aim to give purchasing managers better control of their departments. Also, departments that use them should do well when company internal audits are made on their operations.

What It Is; How It Works

Every company operates in a framework of objectives, plans and policies laid down by management.

Each department, in turn, is charged with carrying out their part in these objectives. This is done through a system of procedures, standards, records, reports, and organization. These are called elements of control.

The job of internal auditing is to measure and evaluate these controls. In other words, when an internal auditor visits your department, he is checking to see how effectively your organization and system is working in line with overall company objectives.

An internal auditor is a staff representative of management. He is usually trained in accounting. Also usually, he reports to the top financial officer of a company, but sometimes directly to the company president. His reports, at any rate, go to top management with copies to audited departments.

Any department in a company may be audited. Frequency of audit varies, but one audit a year is normal for most departments.

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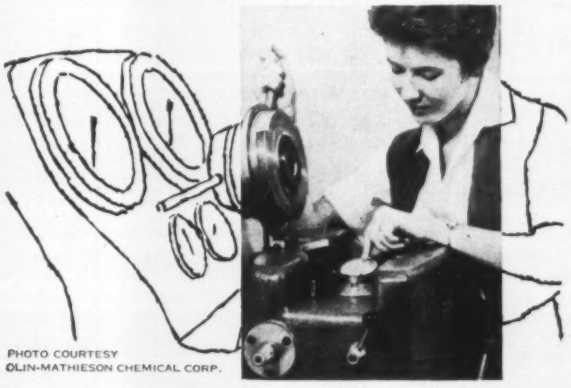

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Will the Second Half Top the First?

Bliss & Laughlin says it expects sales in the second-half to top the first six months.

This bar supplier will start work on one new plant this year, and is considering two more.

■ Bliss & Laughlin, Inc., major independent producer of cold finished bars will start work on at least one new plant this year. And it is considering at least two more. The announcement comes from B&L president F. J. Robbins.

The company, which operates six plants, reports that the pickup has been noticeable at all locations except Detroit.

Delivery Promises—If the current rate of gain continues, delivery times will at least double by the end of the current quarter, Mr. Robbins believes. They now average about three weeks. During the past month, average delivery time had already advanced about one week.

A major factor in the current advance has been the increased cold-drawn bar purchases by steel service centers, the farm equipment industry, and a host of small buyers. Appliance buyers, while purchasing more steel than they did a month ago, are gaining at a slower pace.

Current Bliss & Laughlin forecasts suggest that sales levels will gain in second quarter, continue moving up in second-half. Total second-half sales are expected to outweigh the first-half period, according to company officers.

Small Stretchout — As yet there has been no general lengthening of delivery promises. Chicago, Detroit and the West Coast report some tightening at the low end scale, but little increase on maximum delivery.

However, many mills say they are being hard pressed to meet the fast delivery demands of customers. And they say a general one to two-week stretchout in delivery promises could come before very long. It would just take a little stronger pickup in business.

Sheet and Strip—At the end of March, output is moving up at the mill level. Further improvements are expected in April. But at least a part of the end-of-the-month gains are due to tonnages being pushed up from April, according to **Cleveland** mills. Automakers are in the process of refiguring April schedules. **Detroit** sources say that in nearly every case the revisions are upward. **East Coast** mills say that automotive tonnage orders are still missing. For the most part, other users are demanding rush tonnages to feed production lines or fiill inventory holes. Largest gains in **Pittsburgh** continue to be made in coated products. Many mills are telling salesmen to watch quotas on galvanized orders. This is true in **Chicago** where delivery promises have lengthened a little. In some cases, **Midwest** mills have received complaints from customers for having missed delivery dates.

Wire—There are encouraging reports from both the **East Coast** and the **Midwest.** Just about all wire products figure in gains. **Philadelphia** sales offices report some of the best business since last summer. But customers want delivery in a hurry. In some cases they have moved April orders up to March delivery. **Chicago** mills are getting some rush orders along with general gains. And at least one such order came from on automaker.

Stainless — Carpenter Steel Co. has announced new price schedules covering stainless Type 410 and 430 cold-heading wire furnished in coils and copper coated. The company says the schedules result in reductions of net prices averaging 8 pct, depending on size and quality. The reductions, effective March 27, were made to make Carpenter competitive with domestic prices on these grades.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	2–5 wks	2–4 wks	2–4 wks	2–4 wks	2–4 wks	5 wks
HR Carbon Sheet	2–4 wks	2–4 wks	1–3 wks	2–3 wks	2–4 wks	4 wks
CR Carbon Strip	2–5 wks	3–5 wks	2–4 wks	2–4 wks	3–4 wks	4 wks
HR Carbon Strip	2–4 wks	2–4 wks	1–3 wks	2–3 wks	2–4 wks	4–5 wks
HR Carbon Bars	1–4 wks	1–3 wks	1–4 wks	1–4 wks	1–3 wks	4 wks
CF Carbon Bars	1–4 wks	1–3 wks	Stock–4 wks	1–6 wks	2–5 wks	1–2 wks
Heavy Plate	1–3 wks	1–2 wks			1–2 wks	5 wks
Light Plate	1–3 wks	1–2 wks	1–3 wks		1–2 wks	4 wks
Merchant Wire	Stock	Stock	Stock		2–3 wks	2 wks
Oil Country Goods	Stock	Stock	Stock		Stock–1 wk	
Linepipe	Stock	1–4 wks	Stock		2–3 wks	Stock
Buttweld Pipe	Stock	Stock	Stock	Stock	2–3 wks	Stock
Std. Structurals	1–4 wks	1–2 wks	1–4 wks	1–4 wks	2–3 wks	Stock–4 wks
Cr Stainless Sheet	Stock–4 wks	Stock–3 wks	Stock–3 wks	Stock–4 wks		
CR Stainless Strip	Stock–4 wks	Stock–3 wks	Stock–3 wks	Stock–4 wks		

COMPARISON OF PRICES

(Effective March 27, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Mar. 27 1961	Mar. 20 1961	Feb. 27 1961	Mar. 29 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Mar. 27 1961	Mar. 20 1961	Feb. 27 1961	Mar. 29 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	11.00	11.00	11.00	11.00
Pig Iron Composites: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$35.50	$35.50	$33.50	$34.50
No. 1 steel, Phila. area	42.50	42.50	38.50	34.50
No. 1 steel, Chicago	39.50*	37.50	31.50	30.50
No. 1 bundles, Detroit	33.50	33.50	30.50	30.50
Low phos., Youngstown	40.50	40.50	38.50	38.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	45.50	52.50
No. 1 mach'y cast, Phila.	50.50	50.50	49.50	51.50
No. 1 mach'y cast, Chicago	51.50	51.50	47.50	52.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$39.17*	$38.50	$34.50	$33.17
No. 2 bundles	27.83	27.83	24.83	22.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.00	29.00	29.00	33.00
Copper, Lake, Conn.	29.00	29.00	29.00	33.00
Tin, Straits, N. Y.	100.50†	100.50	100.50	99.75
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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*Appears in the March 23-April 6 issues.

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Domestic Buying: Coming Soon?

Export demand is still the major factor in a strong scrap market. Prices continue to rise.

But now scrapmen wonder if prices will stay up without home support. They wonder if and when this support will come.

■ Backed by continued strong export demand, scrap prices are up again this week. But now scrapmen are beginning to wonder if prices can keep climbing without additional domestic support.

They are also wondering when—or if—domestic activity will increase.

The general national picture this week shows mills are still reluctant to enter the market for major buys. Without this support, prices could level off soon. Mill resistance is still felt in Chicago, Philadelphia, Pittsburgh, Cleveland and New York. But there are reports that local mills may make market debuts soon in Detroit, Cincinnati and on the West Coast.

Export pressure forced brokers in Birmingham to raise quotations $4 on some grades this week.

The IRON AGE composite price for No. 1 heavy melting rose to $39.17 on the basis of gains in Chicago. The composite price for No. 2 heavy melting remains unchanged.

Exports

Prices quoted on p. 154 are going prices as obtained in the trade by The IRON AGE based on representative tonnages. Unless otherwise noted, they are per gross ton delivered to consumer. Where a significant portion of the scrap purchased in an area is for export, however, the price or prices paid for export will be a factor in determining the prices quoted herein.

Pittsburgh — The market continues to show signs of strength. But brokers doubt that it can go much further without consumer support. Prices of $37 and $40 are being paid for No. 1 grades in nearby districts. A local mill is paying $42 for 5 ft low phos scrap. Auto bundles are expected to bring at least as much as last month. There is also talk that better than $40 may be paid in Pittsburgh for export scrap. However, there is still no sign that local mills need or want any volume of scrap.

Chicago — Despite additional blast furnace capacity brought on last week, scrap prices again advanced as local buyers met export price offers. At the same time, buyers of material for export began placing additional orders. A market break had been expected last Thursday. But by Friday, the market again advanced. Area supplies are low.

Philadelphia — Export activity continues strong. One leading broker in the area calls it "terrific." He says about 70 pct of the activity is for export. Local mills and foundries are in the market for limited tonnage, but not enough to warrant further price rises. However, one mill did purchase machine shop turnings at $16 this week, bringing a rise in that and related grades.

New York — Market continues strong and steady. Steelmaking grades are moving well at current prices. But all other grades are still in poor demand. European buyers are the key to the immediate outlook.

Detroit — There's evidence of slightly greater domestic interest and market strength. Quality is becoming a major factor. One large mill is very selective on No. 2 bundles, rejecting half the cars in some cases.

Cleveland—Area auto lists are about the same size as last month. But there may be additional tonnage later for re-bid if production is increased. A very small sale of No. 1 heavy melting was made at $40 in the Valley.

Cincinnati—The market is up $1 on No. 1 grades on appraisal. It's expected to go even higher on the basis of new orders. Area mills may be in the market soon.

St. Louis—There is strong demand for export scrap. However, pressure by mills has kept all but small amounts from moving out of the area thus far.

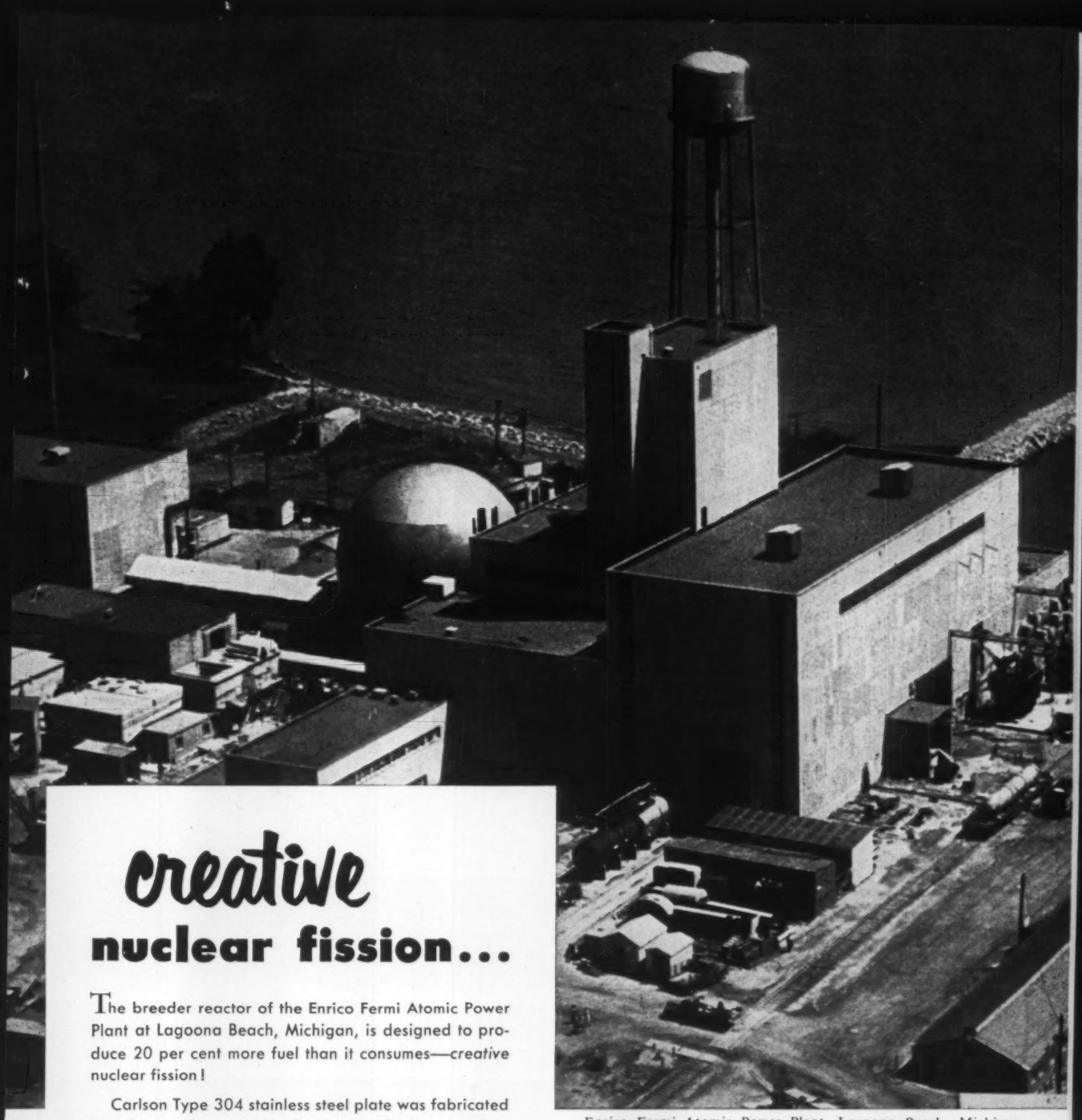
Birmingham — Brokers have at last yielded to the pressure of exports and substantially raised quotations on some items. An Atlanta mill is paying $4 more for No. 2 heavy melting.

Buffalo — Continued pressure from outside markets has strengthened this market. There was some limited export buying.

Boston—Export activity is still the dominant factor in this market. But there is some limited domestic buying.

West Coast—Exporters are taking top steelmaking grades. It's reported that they're paying $3 per ton above the listed prices. There are also reports that major mills will come into the market in April.

Houston — The market appears to have stabilized. The district mill's current order goes through April; export activity continues brisk.



creative nuclear fission...

The breeder reactor of the Enrico Fermi Atomic Power Plant at Lagoona Beach, Michigan, is designed to produce 20 per cent more fuel than it consumes—*creative* nuclear fission!

Carlson Type 304 stainless steel plate was fabricated into the reactor vessel by Combustion Engineering, Inc. This plate must withstand the high temperatures and severely corrosive conditions associated with nuclear service.

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Enrico Fermi Atomic Power Plant, Lagoona Beach, Michigan. Reactor section built, owned, and will be operated by Power Reactor Development Company. Conceptual design by Atomic Power Development Associates, Inc. Detail design and construction of reactor vessel by Combustion Engineering, Inc. The turbine-generating plant is built, owned, and will be operated by The Detroit Edison Company.

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SCRAP PRICES *(Effective March 27, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. punch'gs plate	43.00 to 44.00
Heavy turnings	32.00 to 33.00
No. 1 RR hvy. melting	40.00 to 41.00
Scrap rails, random lgth	47.00 to 48.00
Rails, 2 ft and under	50.00 to 51.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	35.00 to 36.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	85.00 to 90.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	40.00 to 41.00
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	46.00 to 47.00
Low phos. punch'gs plate, ¼ in. and heavier	45.00 to 46.00
Low phos. 2 ft and under	42.00 to 43.00
No. 1 RR hvy. melting	42.00 to 43.00
Scrap rails, random lgth	50.00 to 51.00
Rerolling rails	60.00 to 62.00
Rails 2 ft and under	53.00 to 54.00
Angles and splice bars	47.00 to 48.00
RR steel car axles	63.00 to 64.00
RR couplers and knuckles	47.00 to 48.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	46.00 to 47.00
Cast iron wheels	37.00 to 38.00
Malleable	49.00 to 50.00
Stove plate	41.00 to 42.00
Steel car wheels	45.00 to 46.00
Stainless	
18-8 bundles and solids	180.00 to 185.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	95.00 to 100.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	43.00 to 44.00
Machine shop turn.	15.00 to 16.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	25.00 to 26.00
Low phos. 5 ft and under	43.00 to 44.00
Low phos. 2 ft punch'gs	45.00 to 46.00
Elec. furnace bundles	44.00 to 45.00
Heavy turnings	27.00 to 28.00
RR specialties	45.00 to 46.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	40.00 to 41.00
Cast iron car wheels	43.00 to 44.00
Malleable	45.00 to 46.00
No. 1 machinery cast.	50.00 to 51.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	38.00 to 39.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast.	37.00 to 38.00
Heavy breakable cast.	31.00 to 32.00
Drop broken cast.	46.00 to 47.00

Youngstown

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Low phos. plate	40.00 to 41.00

Cleveland

No. 1 hvy. melting	$34.50 to $35.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	35.50 to 36.50
No. 1 factory bundles	41.00 to 42.00
No. 2 bundles	22.50 to 23.50
No. 1 busheling	35.50 to 36.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	39.00 to 40.00
Low phos. punch'gs plate	36.50 to 37.50
Drop forge flashings	34.50 to 35.50
Foundry steel, 2 ft & under	33.00 to 34.00
No. 1 RR hvy. melting	38.50 to 39.50
Rails 2 ft and under	51.00 to 52.00
Rails 18 in. and under	53.00 to 54.00
Steel axle turnings	26.00 to 27.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	47.00 to 48.00
Stove plate	41.00 to 42.00
Malleable	46.00 to 47.00
Stainless	
18-8 bundles	175.00 to 180.00
18-8 turnings	95.00 to 100.00
430 bundles	85.00 to 90.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 busheling	29.00 to 30.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Low phos. plate	35.00 to 36.00
Structurals and plate, 2 ft and under	37.00 to 38.00
Scrap rails, random lgth	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00

St. Louis

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
Foundry steel, 2 ft	32.00 to 33.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	42.00 to 43.00
RR specialties	39.00 to 40.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	53.00 to 54.00
Unstripped motor blocks	35.00 to 36.00

Birmingham

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft & under	34.00 to 35.00
Bar crops and plate	43.00 to 44.00
Structural and plate, 2 ft	42.00 to 43.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rail, random lgth	41.00 to 42.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	43.00 to 44.00
No. 1 cupola cast.	44.00 to 45.00
Stove plate	44.00 to 45.00
Cast iron car wheels	35.00 to 36.00
Unstripped motor blocks	33.00 to 34.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	26.00 to 27.00
No. 2 dealer bundles	20.00 to 21.00
Machine shop turnings	2.00 to 3.00
Mixed bor. and turn.	3.00 to 4.00
Shoveling turnings	5.00 to 6.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast.	36.00 to 37.00
Mixed yard cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	30.00 to 31.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	28.00 to 29.00
Mixed cupola cast.	35.00 to 36.00
Automotive cast.	39.00 to 40.00
Stainless	
18-8 bundles and solids	155.00 to 160.00
18-8 turnings	55.00 to 60.00
430 bundles and solids	60.00 to 65.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.50 to $30.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	4.00 to 4.50
Shoveling turnings	8.50 to 9.00
Clean cast. chem. borings	13.50 to 14.50
No. 1 machinery cast.	40.00 to 41.00
Mixed cupola cast.	32.00 to 32.50
Heavy breakable cast.	26.50 to 27.50

San Francisco

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	37.00
No. 1 dealer bundles	32.00
No. 2 bundles	$23.00 to 25.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 cupola cast.	46.00 to 48.00

Los Angeles

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	$37.00 to 38.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	25.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	15.00
Elec. furnace 1 ft and under (foundry)	45.00
No. 1 cupola cast.	45.00

Seattle

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	38.00
No. 2 bundles	25.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

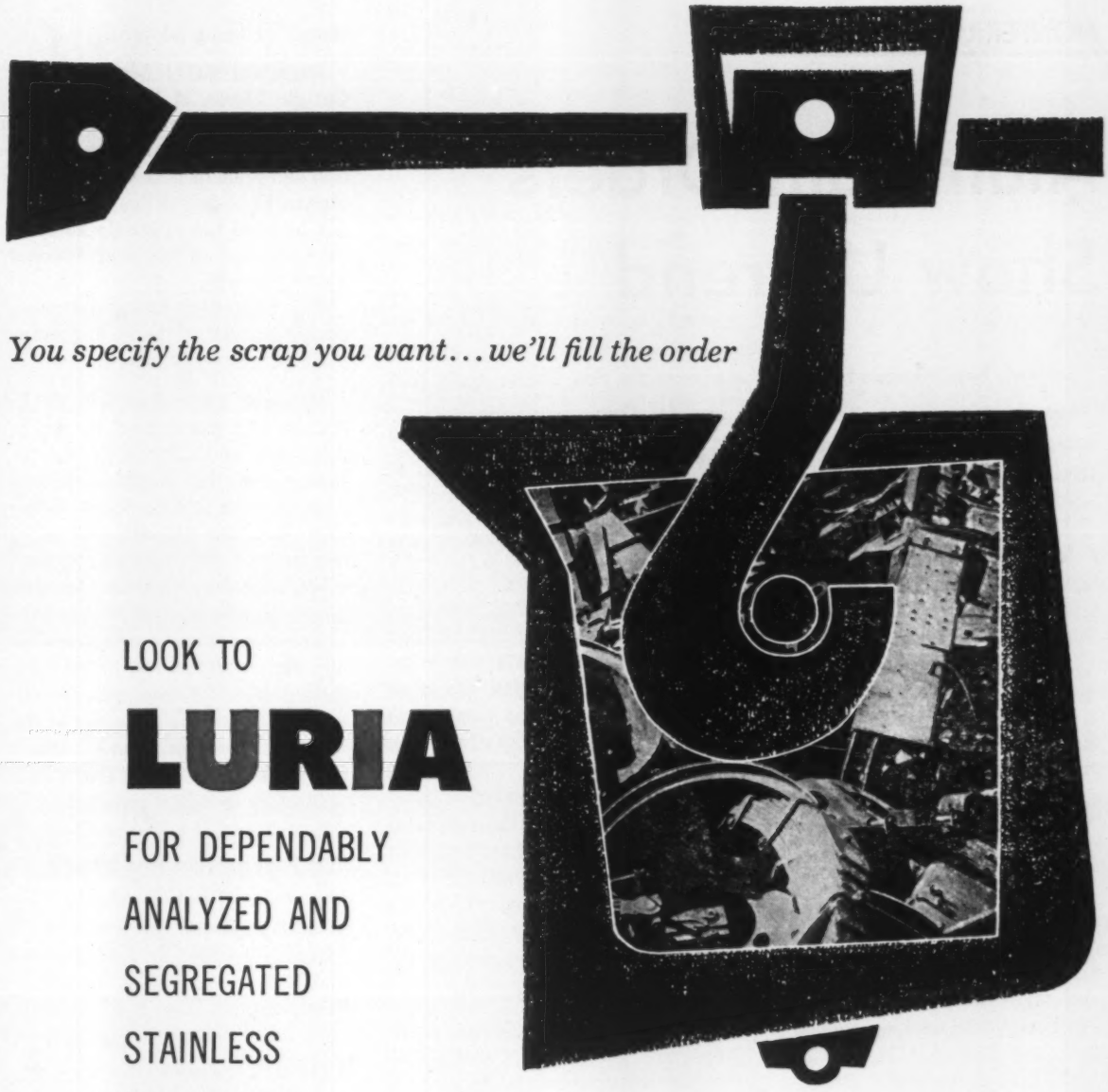
Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$28.50
No. 2 hvy. melting cut 3 ft and under	25.00
No. 1 dealer bundles	28.50
No. 2 bundles	18.00
Mixed steel scrap	20.00
Bush., new fact., prep'd	28.50
Bush., new fact., unprep'd	22.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	36.00
No. 2 bundles	28.00
Machine shop turn.	8.00
Shoveling turnings	11.00
Cut structural plate 2 ft & under	$50.00 to 51.00
Unstripped motor blocks	32.00 to 33.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	30.00 to 31.00



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Aluminum Orders Show Uptrend

Business hasn't begun to boom.

But aluminum new order gains reflect an industry upturn. All products and markets are sharing in the improvement.

■ Major U. S. aluminum producers report their new orders outlook is brighter than it has been at any time in the last year or so.

This doesn't mean business is starting to boom. It's not.

One company spokesman calls the improvement in new orders "modest." A spokesman for another company says the move upward is "very gradual." And a third says it is "nothing stupendous."

Traced Back — However, companies trace back the beginning of the upturn in new order volume to somewhere between mid-January and mid-February. This means it has been going on long enough to be called a trend.

Generally, the gains are across the board. All mill products, markets, and geographic areas are sharing, to different degrees.

These last two factors have made aluminum producers cautiously optimistic about business in 1961.

Varied Markets—To pin the advance in buying, a markets approach seems valid. Markets improving fastest include building and construction, with the emphasis on residential housing; electrical and appliances; and transportation, other than autos.

Mill products in greatest demand in these markets—wrought products, mostly sheet and plate—are showing the greatest rate of improvement. Foil is also doing particularly well.

In contrast, permanent mold and sand castings, extrusions and forgings—items used heavily by automakers—are showing less improvement. Right now, autos is the laggard market.

Area Pickups — Geographically, the situation is a little more difficult to figure. One company notes that business from the East Coast to Chicago seems to be picking up faster than in other parts of the country.

Yet others report buying in some Eastern areas, like Pittsburgh, is trailing some Midwest areas such as Cincinnati and St. Louis.

And Los Angeles seems to be a particularly bright spot in the general average improvement on the West Coast.

Low Inventories—Several mills are now guessing that many customers are down to marginal inventories.

One major mill reports its shipments rate in March is up about 20 pct over February. And this appears to be very close to, or just slightly higher than, the industry average.

Lead-Zinc

The International Lead - Zinc Study Group, meeting now at Mexico City under the auspices of the United Nations, has two interesting ideas to consider.

Both would require a high degree of cooperation on an international level. So critics say that, at first glance, neither has a very strong chance of being adopted.

Regulated Bid — Senor Antonio Carrillo Flores, of Mexico, recommended an international agreement to regulate production, consumption and price of lead and zinc. Observers say Senor Flores obviously has in mind the relatively successful operation of the International Tin Agreement.

This suggestion isn't given much chance because of the U. S. government policy against cartels.

Research Plan—Dr. Schrade F. Radtke is a member of the U. S. delegation and director of the research programs of the American Zinc Institute and the Lead Industries Assn. He suggests a cooperative international research program, supplemented by vigorous sales and marketing efforts.

There seems to be no categorical objection to this in any of the delegations from 25 lead-zinc producing and consuming countries at the sessions. However, some suggest that working out details might be a road-block to such a program.

Tin Prices for the Week

March 21—104.125; March 22—104.125; March 23 — 104.375; March 24—104.75; March 27—104.75.*

*Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	29.00	30.00	1/16/61
Copper (CS)	29.00	30.00	1/11/61
Copper (L)	29.00	30.00	1/16/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig Velasco, Tex. **NICKEL:** Port Colborne, Canada. **ZINC:** prime western. Other primary prices, pg. 157.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13	.....	51.36	55.32
Brass, Yellow	48.10	48.39	48.04	52.26
Brass, Low	50.65	50.94	50.59	54.71
Brass, Red	51.54	51.83	51.48	55.60
Brass, Naval	52.86	59.17	46.67	57.02
Munts Metal	50.94	.....	46.25	.....
Comm. Bz.	52.98	53.27	52.92	56.79
Mang. Bz.	56.80	.....	50.20	.....
Phos. Bz. 5%	74.59	74.34	75.09	76.52

Free Cutting Brass Rod 33.71

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb) ... $1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz..... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb..... 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $206 to $208
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz... $24 to $26
Platinum, dollars per troy oz... $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 28.25
- No. 120 ..... 27.50
- No. 123 ..... 26.75

80-10-10 ingot
- No. 305 ..... 32.75
- No. 315 ..... 30.50

88-10-2 ingot
- No. 210 ..... 40.50
- No. 215 ..... 37.25
- No. 245 ..... 32.50

Yellow ingot
- No. 405 ..... 24.25

Manganese bronze
- No. 421 ..... 28.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.25-24.50
- 0.60 copper max. 24.00-24.25

Piston alloys (No. 132 type).. 26.00-27.00
No. 12 alum. (No. 2 grade)... 22.75-23.25
108 alloy 23.25-23.75
195 alloy 25.75-26.75
13 alloy (0.60 copper max.)... 24.00-24.25
AXS-679 (1 pct zinc) 23.00-24.00

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 23.75-24.75
- Grade 2—92-95% 22.50-23.50
- Grade 3—90-92% 21.50-22.50
- Grade 4—85-90% 21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	25	24¼
Yellow brass	19¼	17⅜
Red brass	22¼	21½
Comm. bronze	23	22¼
Mang. bronze	18⅛	17⅜
Free cutting rod ends.	18⅜	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26
- No. 2 copper wire 24¼
- Light copper 22
- *Refining brass 22¾
- Copper bearing material 21¾

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26
- No. 2 copper wire 24¼
- Light copper 22
- No. 1 composition 22
- No. 1 comp. turnings 21½
- Hvy yellow brass solids 16½
- Brass pipe 14½
- Radiators 17½

Aluminum

- Mixed old cast. ..... 12½—13
- Mixed new clips ..... 14½—15
- Mixed turnings, dry ..... 13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	23	—23½
No. 2 copper wire	21	—21½
Light copper	19	—19½
Auto radiators (unsweated)		14
No. 1 composition	18	—18½
No. 1 composition turnings	17	—17½
Cocks and faucets	14	—14½
Clean heavy yellow brass	11	—11½
Brass pipe	14½	—15
New soft brass clippings	14	—14½
No. 1 brass rod turnings	14	—14½

Aluminum

Alum. pistons and struts	6½	— 7
Aluminum crankcase	8½	— 9
1100 (2s) aluminum clippings	11½	—11¾
Old sheet and utensils	8½	— 9
Borings and turnings	4½	— 5
Industrial castings	9	— 9½
2020 (24s) clippings	10	—10½

Zinc

New zinc clippings	5½	— 5¾
Old zinc	2¾	— 3
Zinc routings	1¾	— 2
Old die cast scrap	1	— 1¼

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	23-23.50
Clean Monel turnings	16.50-17
Old sheet Monel	22-23
Nickel silver clippings, mixed.	18
Nickel silver turnings, mixed.	15

Lead

Soft scrap lead	7	— 7½
Battery plates (dry)		2¾
Batteries, acid free	2	— 2¼

Miscellaneous

Block tin	75	—77
No. 1 pewter	57	—58
Auto babbitt	43	—44
Mixed common babbitt	9½	—10
Solder joints	13½	—14
Small foundry type	8½	— 9
Monotype	8¾	— 9¼
Lino. and stereotype	8	— 8¼
Electrotype	7½	— 7¾
Hand picked type shells	5¼	— 5⅝
Lino. and stereo. dross	1¾	— 2¼
Electro dross	2	— 2½

(Effective Mar. 27, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3, B4, M10* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective Mar. 27, 1961)

STEEL PRICES

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		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*				$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*				Holloware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective Mar. 27, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*	6.375*P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.		5.675 *B3*									
	Fairless, Pa.	5.825 *U1*	5.825 *U1*									
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875*L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher.

* Special Quality.

(Effective Mar. 27, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	Pct
Plain finish—packaged and bulk.	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	Pct
Plain finish—packaged and bulk.	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)	
Plain finish—packaged and bulk.	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50–32.75	32.00	29.50–34.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R5;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	2	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Mar. 27, 1961)

MERCHANT WIRE PRODUCTS

	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
F.o.b. Mill	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*	173	.....	.....	.....	.....	9.00	9.55†
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (16 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	7.87	9.71	10.16	10.28	8.44	9.13	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	16.76	.....	.....
Boston	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.79	16.69	23.89	21.04
Buffalo	.15	8.70	9.45	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.85	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	11.20	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		10.17	10.98	11.35[3]	11.73	9.41	9.81	9.58	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	11.20	12.20	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.13	10.50	.....	10.79	8.81	9.16	8.97	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.51	10.49	10.99	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.24	20.49
New York	.10	9.77	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.90	10.10	10.99	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		9.45	11.30	12.35	11.45	9.60	10.05	9.45	16.65	18.60	17.80	22.70	22.20
San Francisco	.10	10.27	11.79[2]	11.50	11.88	10.48	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.80	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.75	11.23	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 1.3¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Mar. 27, 1961)

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $280 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

Rear-pump body for automatic transmission cast from gray iron using shell-molds and -cores.

modern shell-mold casting for:

IMPROVED ACCURACY

Size and location of the oil ports in the pump body illustrated are maintained within *a tolerance of 0.015 inch* by using shell-cores.

SMOOTHER FINISHES

Faithful reproduction obtained with shell-molds, and the absence of burnt-in sand reduce the amount of machining and finishing required.

GREATER RELIABILITY

Carefully controlled analysis plus precise heat-treating in our own modern facilities insure uniformly high quality and dependability.

OVERNIGHT DELIVERY WITHIN 500 MILES

to fill your IMMEDIATE NEEDS for QUALITY PRECISION CASTINGS at LOWER COST

GL GREAT LAKES FOUNDERS & MACHINE CORP.
LUDINGTON, MICH.

Specialists in Stack, CO_2, and Shell-Mold Casting

C M Established 1868

IMAGINATION IN PERFORATED MATERIALS

New materials, new techniques have opened broad horizons for perforated materials in industrial design.

Texturing of perforated metals offers a dramatic opportunity to increase visual appeal while adding structural strength.

In addition to flat sheets, we can supply distinctive Mundt patterns in coils, in all colors and a variety of plated as well as cladded surfaces.

Mundt's comprehensive new catalog will stimulate your imagination in developing practical applications for perforations in your products. It belongs in your design file. Write today.

CHARLES MUNDT & SONS
Our 92nd Year
53 FAIRMOUNT AVE., JERSEY CITY 4, N. J.

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 65-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	33.25
0.05% C....	34.00	1.00% C....	33.00
0.10% C....	33.75	1.50% C....	32.75
0.20% C....	33.50	2.00% C....	32.50

3-5% C, 53-63% Cr, 2.5% max. Si... 26.00
4-6% C, 58-63% Cr, 3-6% Si..... 22.50
5-8% C, 58-63% Cr, 3-6% Si..... 22.50
6-8% C, 50-56% Cr, 4-7% Si..... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
0.025% C (Simplex) 31.50
0.010% C max, 63-66% Cr, 5-7% Si. 32.50
0.010% C max, 68-71% Cr, 2% Si max 31.50
0.25% C max 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	22.50	14.60
Ton lots	30.45	16.05
Less ton lots	33.40	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19% ..	$98.00	$96.00	$100.50
19-21% ..	100.00	98.00	102.50
21-23% ..	102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads (Bulk)	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe ..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

(Effective Mar. 27, 1961)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y. per lb.

Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, del'd per lb con't Cb

Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
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Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

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Ton lots (packed) $1.46
Less ton lots (packed) 1.57

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Qu.	KW	Make	RPM	DC Volts	AC Volts
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1	2400	GE	450	300	2300/4600
1	2000	GE	514	600	2300/4600
2	1750/2100	GE	514	250/300	2300/4600
1	1750	GE	514	600	2300/4600
1	1500	GE	720	600	6600/13200
1	1000	GE	720	275	2300/4160
1	1000	GE	900	260	4000/6600
1	1000	GE	900	600	2300/4160
1	500	GE	900	125/250	440
1	500(New)	GE	1200	300	2300
1	500	GE	900	250	2300/4160/4160
1	300	GE	1200	275	2300/4160
1	300	GE	1200	250	440/2300
1	250	GE	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2300
1	200	El.Mhy.	1200	250	2300/4600
1	150	GE	1200	275	2300
1	150	Whse.	1200	275	2300

D. C. MOTORS

Qu.	KW	Make	Type	Volts	RPM
1	3900(New)	GE	Enc. S.V.	475	320
1	3000(New)	Whse.	Enc. F.V.	525	600
2	2700	GE	Enc. S.V.	415	280
1	2250(New)	GE	Enc. S.V.	600	200/300
1	2200	GE	MCF	600	400/500
2	2000	GE	Enc. S.V.	350	230/350
2	1750	GE	Enc. S.V.	250	175/350
2	1500	Whse.	New	600	300/700
4	1500	Whse.	New	525	600
1	1300	GE	MCF	300	200/400
1	1200	GE	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D-8	600	600/900
2	900	GE	MCF	250	180/360
1	850	GE	MCF	250	85/170
1	750	GE	MCF	600	120/360
2	750	GE	MCF	600	450/900
2	645	SS		300	1000
4	600	Whse.		250	275/550
5	400	GM	D-8	250	300/900

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Pittsburgh Dealers Await Upturn

Used machinery dealers in Pittsburgh are still waiting for business to get better.

They say buyers lack confidence. Inquiries are good but sales aren't in line.

■ Pittsburgh used machinery dealers still wait for orders to turn upward.

There was a mild improvement early in the year. One dealer said business was almost normal for a few weeks. However, this proved to be only a spurt.

February was a worse month than January for a supplier of general machinery. And most dealers see nothing to indicate the end of this recession.

According to one source, their is still no real confidence on the part of buyers. Plants want equipment and need it; they are making inquiries. But orders are held off until there is a specific and urgent need. Then, the customer wants his machine in a rush.

Changing Signs — A few weeks ago, there were signs users might be breaking out of their shell. Sales of cut-off saws, presses and machine tools moved up sharply for one dealer. The advance was broad and it reached pre-recession heights.

But in more recent weeks, the old hesitation and slowness has returned. "It's still a buyers' market," says the dealer. "They'll go an extra 50 miles to save $50."

Another dealer reports a similar condition. There is a little interest in brakes, shears and mill equipment. But sales have been going down instead of up. The slide is blamed again on lack of confidence.

Shopping—This dealer says the supply of equipment is good. "There are more machines than customers." He finds the same tendency to shop around and delay orders.

A supplier of electrical equipment says business is a little better. Sales have risen 5 to 10 pct. Inquiries have picked up still more.

However, this dealer says there is still day-to-day uncertainty. Two weeks ago he was told by steel mills they had some big orders coming up and would be starting sustained construction programs. Now, the same mills are talking less confidently and are holding up new jobs.

Must Bargain — Reflecting the condition of the market, electrical dealers must bargain with even their biggest customers to get business. A bid will be submitted and the customer will come back with an offer to buy at a lower figure.

Also reflecting the times, big and small companies are slow paying for equipment. This may indicate a cash squeeze but it is thought to be more a case of reduced accounting staffs.

Sales and inquiries are a little better for a supplier of materials handling equipment. The smaller companies are putting in a few conveyors and light cranes. However, there is no sustained, decisive movement upward.

Push Needed—For a real recovery, says this dealer, there has got to be a positive push by the steel mills. This hasn't happened yet. If one department of a mill shows improvement, another will drop down.

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1—STRUCTURAL STEEL BUILDING, Length 400 Ft.; span 59'0", height of crane rail 40', includes 75 ton D.C. crane.
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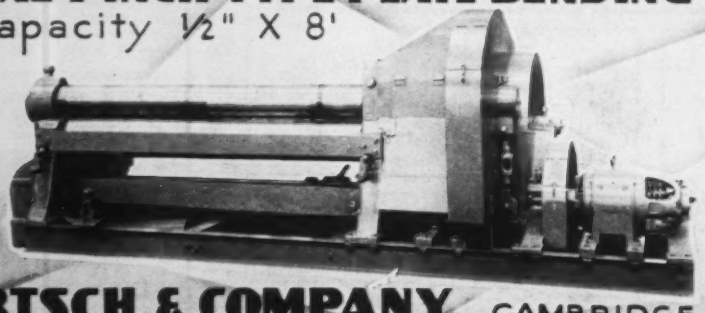

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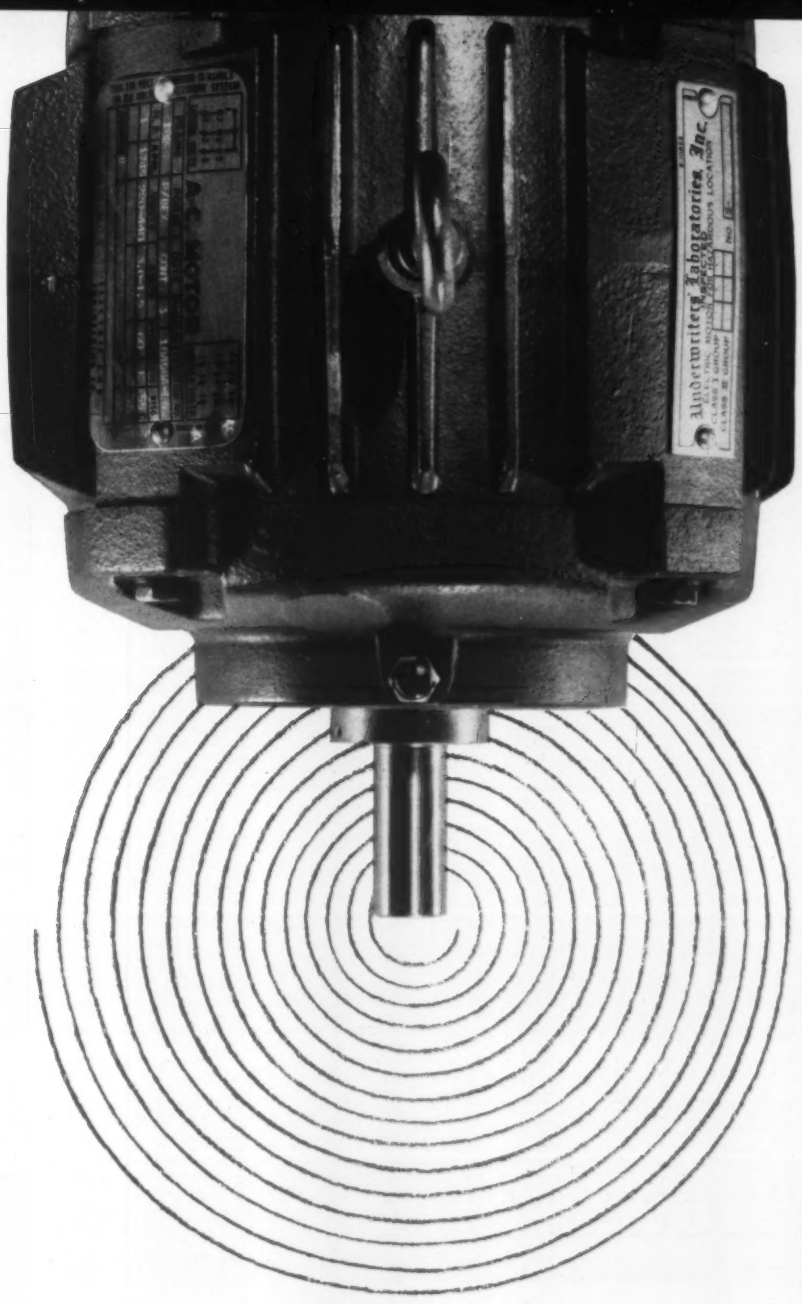

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